UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

MURRAY RUBINSTEIN, JEFFREY F. ST. CLAIR, WILLIAM MCWADE, HARJOT DEV and VIKAS SHAH, individually and on behalf of all others similarly situated,	)	
Plaintiffs,	)	Case No. 14-cv-9465
	)	Judge Robert M. Dow, Jr.
v.	)	
RICHARD GONZALEZ and ABBVIE INC.,	)	
Defendants.	)	

EXPERT REBUTTAL REPORT OF CHAD COFFMAN, CFA

June 14, 2018

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I. INTRODUCTION

1. On December 21, 2017, I submitted an expert report in this matter ("Coffman Efficiency Report"),[1] in which I concluded that Shire ADSs and Shire Options traded in efficient markets during the Class Period,[2] and that damages can be calculated subject to a class-wide formula and methodology consistent with Lead Plaintiffs' claims.[3] On March 9, 2018, I submitted a supplemental analysis of Shire Options ("Coffman Supplemental Efficiency Report," collectively, my "Prior Reports"), which led to the same conclusions regarding market efficiency for Shire's Options.[4]

2. Following the submission of my Supplemental Efficiency Report, Class Counsel provided me with the Report of Allan W. Kleidon, Ph.D. ("Kleidon Report") and asked me to review and respond to Dr. Kleidon's contentions that (1) my analysis purportedly did not establish market efficiency for Shire's Options during the Class Period,[5] and (2) I purportedly did not articulate a damages methodology consistent with Plaintiffs' claims in this action.[6]

3. In formulating my opinions set forth in this Rebuttal Report, I have relied upon the analysis already described in my Prior Reports and my knowledge, experience, and formal training in economics, finance, and statistics in addition to Plaintiffs' allegations and the factual information provided to me by Class Counsel. In performing the analyses set forth in this Rebuttal Report, I also have considered: (1) the Kleidon Report; (2) the backup material

[1] Capitalized terms in this Rebuttal Report have the same meaning as in my Efficiency Report.

[2] Coffman Efficiency Report ¶¶ 6 & 7.

[3] Coffman Efficiency Report ¶¶ 6 & 7.

[4] Coffman Supplemental Efficiency Report ¶ 2.

[5] Kleidon Report ¶ 5.

[6] Kleidon Report ¶ 6.

provided by Dr. Kleidon; (3) Dr. Kleidon's deposition;[7] and (4) other relevant materials and information. I also performed additional analyses to test certain assertions made in the Kleidon Report. All the materials that I relied upon and considered in reaching my opinions in this Rebuttal Report are identified in the attached **Appendix A** and a similar Appendix to my Prior Reports.

4. In summary, Dr. Kleidon does not challenge my finding that the market for Shire ADSs was efficient and nothing in the Kleidon Report changes my conclusions that Shire Options traded efficiently or that economic damages in this matter can be calculated and quantified subject to a common approach and methodology consistent with Plaintiffs' theory of the case and applied class-wide.

II. SUMMARY OF OPINIONS

5. The additional opinions I have reached in this matter can be summarized as follows:

6. Dr. Kleidon does not dispute my methodology for assessing market efficiency for Shire ADSs.

7. Dr. Kleidon does not dispute my conclusion that Shire ADSs traded in an efficient market during the Class Period, nor does he provide his own opinion whether Shire ADSs traded in an efficient market during the Class Period.[8]

8. Although he criticizes my methodology for assessing market efficiency for Shire Options, Dr. Kleidon does not provide his own opinion whether Shire Options traded in an efficient market during the Class Period, nor does he provide an alternative methodology for

[7] Deposition of Allan W. Kleidon, May 25, 2018 ("Kleidon Deposition").

[8] Kleidon Deposition p. 23:18-21; pp. 26:16-27:10.

analyzing market efficiency for Shire Options.[9]

9. Dr. Kleidon does not provide any analysis of, or opine on, the efficiency of the market for any individual series of Shire Options or for any sub-set of Shire Options.[10] Analysis of a subset of options that represent the vast majority of relevant transactions provides further evidence of market efficiency.

10. Nothing in the Kleidon Report disturbs my opinion that Shire Options traded efficiently during the Class Period.

11. Dr. Kleidon's assertions about class-wide damages are incorrect and irrelevant.

12. Dr. Kleidon does not provide any economic evidence suggesting a lack of price impact from the alleged material misrepresentations and omissions that are the subject of Plaintiffs' claims.

13. The following sections respond to Dr. Kleidon's criticisms and provide the basis for the additional opinions I have reached.

III. RESPONSES TO DR. KLEIDON'S CRITICISMS

A. DR. KLEIDON'S CRITICISMS OF MY METODOLOGIES FOR ASSESSING MARKET EFFICIENCY FOR SHIRE OPTIONS ARE MISPLACED

i. There is a cause and effect relationship between Shire-specific news and the prices of Shire Options

14. Separate from my analysis of the efficiency of the market for Shire ADS securities (which Dr. Kleidon does not dispute), and his speculative and irrelevant arguments about how Plaintiffs will prove loss causation (Kleidon Report Section V), the Kleidon Report largely focused on what I purportedly failed to establish regarding market efficiency for Shire Options

[9] Kleidon Deposition p. 23:16-18; p. 26:11-15; p. 29:4-13.

[10] Kleidon Deposition p. 30:7-9.

(Kleidon Report Section IV).

15. Notwithstanding Dr. Kleidon's criticism of my methodology, my Prior Reports provide direct evidence of market efficiency by showing a cause and effect relationship between new Shire-specific news and price indices of Shire Options.[11] As I described in my Efficiency Report, *Cammer* Factor 5 suggests that a showing of a cause and effect relationship between securities prices and new firm-specific news provides important evidence of market efficiency.[12]

16. Dr. Kleidon does not provide any explanation why Shire Options might have traded inefficiently (a conclusion he does not reach) given that Shire ADSs traded efficiently (a conclusion that he does not dispute) during the Class Period.

17. Dr. Kleidon asserts that evaluating market efficiency for options requires a separate cause and effect examination of each and every option series.[13] Notably, Dr. Kleidon provides no authority to substantiate his assertion. Nor does he provide any authority for his related assertion that aggregate evidence regarding the price behavior of options is insufficient to support the conclusion that Shire Options traded in an efficient market during the Class Period.

18. I note as an initial matter that, in addition to the aggregate evidence I considered, I also performed a put-call parity test using prices at the individual option series level,[14] which provides economic evidence that prices at the individual option series level are consistent with efficient trading. The analyses described in my Prior Reports have been sufficient to support a

[11] Coffman Efficiency Report ¶¶ 89-97; Coffman Supplemental Efficiency Report ¶¶ 9-12.

[12] *Cammer*, 711 F. Supp. at 1291 ("… [O]ne of the most convincing ways to demonstrate [market] efficiency would be to illustrate, over time, a cause and effect relationship between company disclosures and resulting movements in stock price.")

[13] Kleidon Report ¶¶ 30-39.

[14] Coffman Efficiency Report ¶¶ 80-83.

finding of market efficiency for purposes of class certification in other matters.[15]

19. Based on my prior experience and my understanding from Class Counsel of how courts have viewed market efficiency for options, I viewed a separate and distinct cause and effect analysis for each option series (of which there are dozens) as an unnecessary use of the resources of the parties and the Court. Nonetheless, in light of Dr. Kleidon's criticism of my methodology, I subsequently identified and performed additional detailed event study analyses for 24 individual option series ("Sample Options") that represent the vast majority (roughly 88%) of the net increase in open interest (*i.e.*, the number of option contracts outstanding). These options also represent the vast majority of the market losses suffered by proposed Class Members on the alleged corrective disclosure after the close of trading on October 14, 2014.[16,17]

20. My subsequent analysis provides further evidence of a clear cause and effect relationship for the Sample Options on the alleged corrective disclosure. **Exhibits 1A – 1X** provide a daily price and volume chart for each series in the Sample Options. For each option series, there is a clear price change on the alleged corrective disclosure in this matter. As one would expect, for each call option the price declines, and for each put option the price increases.

[15] Dr. Kleidon cites to three cases in which I have opined on options (Kleidon Report n. 19). In two of those cases, the courts found my analysis to be sufficient for class certification. The third case cited by Dr. Kleidon settled prior to class certification, but options were included in the settlement class. In addition, it is my understanding that other courts have not required analysis of individual option series to certify a class of options purchasers.

[16] I focus on the net increase in open interest as the appropriate metric for determining inclusion in the Sample Options because an increase in open interest during the Class Period represents an unambiguous addition of a proposed Class member. I chose this measure over trading volume because trading volume can often reflect the elimination of an open interest, which would remove rather than add someone to the proposed Class. The Sample Options also represent over 80% of the total dollar value of losses for proposed Class members on the alleged corrective disclosure (*i.e.*, the economic losses that would potentially translate to damages).

[17] Two of the factors discussed in *Cammer* (Analyst Coverage and S-3 eligibility) that I analyzed for Shire ADSs apply equally to Shire Options (Coffman Efficiency Report Sections VII.C & E). Moreover, since Shire Options are traded on multiple national exchanges (*see*, Coffman Efficiency Report ¶ 82), a third *Cammer* factor, "Market Makers," is also met based upon the discussion of that factor in Section VII.D of my opening report. Dr. Kleidon does not address any of these factors that are clearly met for all Shire Options.

To further formalize this analysis, I performed an event study for each individual option series to test whether there was a statistically significant price movement on the alleged corrective disclosure. This analysis is summarized in **Exhibit 2**.[18] For 21 of the 24 Sample Options, there is a statistically significant price change on the alleged corrective disclosure in the direction one would expect at the 95% confidence level (18 at the 99% confidence level).[19]

21. The analyses above demonstrate that Dr. Kleidon's criticism that I did not perform cause and effect analyses on a series-by-series basis is without merit. Having performed the analyses on a series-by-series basis for the Sample Options confirms and amplifies my prior conclusion that there is a cause and effect relationship between new firm-specific news and the prices of the relevant Shire Option series.

22. While Dr. Kleidon criticized the methodology in my Prior Reports, he offered no opinion that a series-by-series analysis of the relevant options fails to support market efficiency. Had he done so, Dr. Kleidon would have found the same evidence of a cause and effect relationship between new firm-specific news and the prices for the relevant Shire Option series

[18] For each trading day in the Class Period, I calculated an expected ADS close price as the previous trading day's observed close price multiplied by the expected ADS return (as described in my Efficiency Report ¶¶ 48-51). I then used the Black-Scholes options pricing model to calculate an options price (based on the observed ADS close price) and the expected options price (based on the expected ADS close price). The Black-Scholes model assumes a risk-free rate of U.S. Treasury securities at 3-month constant maturity according to the Federal Reserve, implied volatility according to iVolatility data, and no dividend payments. I then calculated the expected option return as each trading day's expected option price divided by the prior trading day's observed options price. The abnormal return is calculated as the observed option return minus the expected option return. The t-statistic is calculated as the abnormal return divided by the standard deviation of the abnormal returns during the Class Period, excluding the alleged corrective disclosure date. The p-value is calculated based on the t-statistic and degrees of freedom equal to the number of observations minus 1.

[19] For one of the Sample Options, there was insufficient pricing data available on the day prior to the corrective disclosure to perform the event study, though the value of the put option appears to have reacted in response to the alleged corrective disclosure, moving from essentially $0.00 to nearly $0.55 (Exhibit 1F). For another Sample Option, there was a very large negative 40% return which was in the expected direction, but the volatility in the security over the short Class Period resulted in a lack of statistical significance (Exhibit 1H). Finally, for one Sample Option there was a positive return when a negative return was expected, but the prices were very close to zero, so small price movements can translate to large returns. Here, the call option was far out of the money even prior to the corrective disclosure and was within four trading days of expiration. In other words, the value of the option was near zero to begin with and remained close to zero through and beyond the alleged corrective disclosure (Exhibit 1N).

that I report herein.

ii. Dr. Kleidon's assertions regarding my use of equal variance are logically incorrect

23. Dr. Kleidon asserts that my cause and effect conclusion of market efficiency for Shire Options does not hold if I were to assume "unequal variance" between news days and non-news days. To be clear, Dr. Kleidon is not disputing the magnitude of the differences I find between news days and non-news days, he is simply questioning an underlying assumption regarding how to compute the degree of statistical significance that should be attached to my finding. As described below, my use of the pooled variance (*i.e.*, equal variance) is the standard approach and entirely justified.

24. Dr. Kleidon asserts that I should have relied upon the separate *ex post* observed variance from "non-news days" and the *ex post* observed variance from "news days" when testing the difference in price changes between non-news days and news days. Dr. Kleidon does not cite to any literature or authority for his proposition that I should have assumed unequal variance in the context of an event study, such as I performed here. The unequal variance procedure advocated by Dr. Kleidon is at odds with the methodology employed in every event study of a single stock that I have observed in either the literature or in the context of securities litigation.

25. In an event study of the kind I performed here, the exercise is to formulate a hypothesis, called the "null hypothesis," and test statistically to determine whether there is sufficient statistical evidence to reject that hypothesis. In this case, the null hypothesis I tested is that there was ***no difference*** in the return-generating process (and thus the distribution of returns) on "news days" versus "non-news days."

26. In any single-stock event study (*i.e.*, a study of the returns for one company's

stock), there is an implicit assumption that there is one underlying return-generating process with a single mean and single variance (*i.e.*, a single market model) for event and non-event days. In other words, *ex ante*, there is no assumption that the return-generating process (and thus the distribution of returns) is different on an event date than any other day when comparing the actual return to the expected return. Stated another way, the proper null hypothesis is that the event date is no different than any other day and would therefore have a mean and variance that are no different than any other day. This standard and ubiquitous underlying assumption is the reason it is appropriate to assume, *ex ante*, that the news days will have equal variance as the non-news days. The fact that the variances turn out to be different *ex post* is not evidence of an improper original assumption. If anything, it is further evidence that supports rejecting the null hypothesis that the news days are like the non-news days (and thus further support for a cause and effect relationship between news and option price movement).

27. My *ex ante* assumption of equal variances for news days and non-news days is *the standard approach for event studies* of the kind I performed here. In a standard event study, the researcher constructs a model of the return-generating process and identifies how imprecise the predictions from this model are (*i.e.*, the variance of the errors). Then, for the date(s) of interest, a t-statistic is calculated based upon the size of the abnormal return divided by the variance from the estimation period (*i.e.*, the variance from the non-event days).[20] In other words, when

[20] Coffman Efficiency Report ¶ 54; Tabak, David I. and Frederick C. Dunbar, "Materiality and Magnitude: Event Studies in the Courtroom," in *Litigation Services Handbook, The Role of the Financial Expert*, Third Edition, Wiley, 2001; MacKinlay, A. Craig, "Event Studies in Economics and Finance," *Journal of Economics Literature* 35(1) (1997), pp. 13-39 (The null hypothesis is "…that the event has no impact on the behavior of returns (mean or variance)", p. 21); Binder, John, "The Event Study Methodology Since 1969," *Review of Quantitative Finance and Accounting* 11 (1998), pp. 111-137; Aharony, Joseph and Itzhak Swary, "Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis," *The Journal of Finance* 35(1) (1980), pp. 1-12.

performing a standard event study on security prices, one uses the constant variance from the estimation period, *not a separate sample variance from days with similar types of news*.

28. Dr. Kleidon's argument assumes that the relevant test being performed is on two samples that are being drawn from two separate distributions. There are many research settings where that occurs and his prescribed approach would be appropriate.[21] But here, where the returns are being drawn from a single distribution (the expected return for a single stock), his approach is at odds with decades of research and precedent. I have never seen the unequal variance approach used in any single-stock event study. Dr. Kleidon's unprecedented approach is inappropriate and erroneous in this context.[22]

iii. Dr. Kleidon's criticisms of my put-call parity test are unfounded and his purported finding of violations of put-call parity are simply incorrect

29. Dr. Kleidon criticizes my put-call parity test in two ways. First, he argues that because there are wide bid-ask spreads for Shire Options, my approach to testing put-call parity does not provide relevant evidence of efficiency. He is mistaken.

30. Put-call parity tests whether an investor can, in effect, simultaneously engage in transactions involving the options (*i.e.*, by buying a call and selling a put or vice versa) at market prices and arbitrage inefficient prices (*i.e.*, lack of parity in the market prices for puts and calls)

[21] If the relevant statistical question were different, then the use of unequal variances would be appropriate. For example, if the question were whether the returns for two *different* stocks responded similarly to a certain type of event, then there would be two different return generating processes: one for each stock. Each would have its own variance. In that case, it would be inappropriate to assume equal variance even if the null hypothesis were true because we know that different stocks can have different variances for reasons unrelated to the nature of the events being tested. Here, we have a single stock with a single return generating process and the assumption of equal variance is entirely appropriate and entirely consistent with how cause and effect is evaluated using event studies.

[22] Dr. Kleidon also asserts I undertook a results-driven approach when deciding to use an equally weighted index instead of a value-weighted index. That assertion is false, and it ignores the clear example and rationale I provided in my Supplemental Efficiency Report (¶¶ 7-8). Dr. Kleidon does not dispute the merits of the rationale I provided. For instance, Dr. Kleidon is not arguing that a value-weighted index is proper or that an equal-weighted index is improper.

for a risk-free profit.[23]

31. Dr. Kleidon asserts that there is evidence of widespread violation of put-call parity if one were to perform the test using the midpoint between the bid price and the ask price for particular put options and call options as though that were the relevant "price" for those options. His procedure for evaluating put-call parity is simply wrong. The put-call parity test is done to determine whether there is evidence of an arbitrage opportunity because actual market prices for puts and calls are simultaneously inconsistent. In considering put-call parity, it is critical to use actual expressions of willingness to trade at particular prices rather than theoretical transaction prices (such as the midpoint).

32. To understand why, consider the following simplified example. Assume that based upon the trading of a call option and the put-call parity relationship, the put option with the same strike price and expiration date must be worth between $2 per share and $3 per share. Assume that one investor bids $2 for the put option. Then assume another investor offers to sell the put option for $5. Neither of these bids or offers are violations of put-call parity. The buyer is looking for a deal at $2, and the putative seller, while setting a price that is unlikely to be acted upon, is not behaving irrationally. There is no violation of economic rationality or put-call parity and thus no actual arbitrage opportunity. However, the midpoint of this range is $3.50 per share. The midpoint of $3.50 is a purely hypothetical price for which there is no actual expression of willingness to trade, but Dr. Kleidon would conclude this represents a violation of put-call parity.

33. Dr. Kleidon cites to no authority suggesting that using the mid-point of the bid-ask

[23] Arbitraging a violation of put-call parity also requires transactions in the underlying stock and/or risk-free instrument, but for purposes of expositional ease I focus on the general idea that in taking advantage of a violation of put-call parity one would be taking advantage of a mispricing between the relevant call and put by taking a long position in one and a short position in the other.

spreads for option prices to evaluate put-call parity is an accepted procedure. However, my use of the bid prices and ask prices is found in the academic literature evaluating put-call parity.[24] Moreover, Dr. Kleidon's finding that over 90% of the prices for Shire Options violated put-call parity is, on its face, not credible. Indeed, Dr. Kleidon conceded at his deposition that his put-call parity tests did not take into account transactions costs and therefore was not really testing whether there were arbitrage opportunities.[25] The whole point of my put-call parity test was to evaluate whether there were arbitrage opportunities.[26] Finding none, my Efficiency Report provided evidence that is consistent with Shire Options trading efficiently.

34. Dr. Kleidon also points out that the magnitude of bid-ask spreads for some Shire Options implies the put-call parity test has low power and therefore does not provide dispositive evidence of market efficiency.[27] I never indicated that the put-call parity test alone was dispositive. Dr. Kleidon's assertion that the test has low power does not in any way suggest the test is invalid or inappropriate. Low power or not, a properly conducted put-call parity test found no violations of put-call parity. While not dispositive proof of market efficiency, this is clearly consistent with market efficiency and provides relevant economic evidence.

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[24] *See*, *e.g.*, Kamara, Avraham and Thomas W. Miller, Jr., "Daily and Intradaily Tests of European Put-Call Parity," *The Journal of Financial and Quantitative Analysis* 30(4) (1995), pp. 519-539; Goh, Leng Y. and David Allen, "A Note on Put-call Parity and the Market Efficiency of the London Traded Options Market," *Managerial and Decision Economics* 5(2) (1984), pp. 85-90; "Chan, Kalok and Y. Peter Chung, "Asymmetric Price Distribution and Bid-Ask Quotes in the Stock Options Market," *Asia-Pacific Journal of Financial Studies* 41(1) (2012), pp. 87-102, found at https://doi.org/10.1111/j.2041-6156.2011.01063.x.

[25] Kleidon Deposition pp. 51:5-52:8.

[26] Coffman Efficiency Report ¶ 84: "If the prices of a put-call pair are not consistent with each other and the underlying security, there would be a violation of put-call parity and a potential arbitrage opportunity. An arbitrage opportunity exists when a trader has the ability to earn a risk-free profit based on inconsistent pricing of securities. Prices that exhibit a consistent pattern of arbitrage opportunities would be inconsistent with market efficiency."

[27] Kleidon Report ¶ 66 including n. 24.

iv. Dr. Kleidon's analysis of trading activity is a red herring. There was substantial trading in the relevant Shire Options during the Class Period

35. Dr. Kleidon notes that I did not analyze trading activity for individual series of Shire Options using the same methodology I utilized for analyzing trading activity for Shire ADSs.[28] However, I did not analyze average weekly trading volume for the options on a series-by-series basis the same way I did for the ADSs[29] because the number of option contracts outstanding at any given time (the open interest) changes substantially over short periods of time because the option transactions themselves can introduce or eliminate the existence of option contracts. Therefore, the same test is not applicable to ADSs and options.

36. Dr. Kleidon notes at length that there was little or no trading during the Class Period for many series of Shire Options and performs an analysis to show that there were many series of Shire Options with little or no trading during the Class Period.[30] However, his analysis is irrelevant because it relates almost entirely to series of options that had either zero or very few proposed Class members and does not provide useful information regarding options series traded by potential Class members.

37. For example, as shown in Exhibit 3 to the Kleidon Report, 385 different series of Shire call options (approximately 80.7% of the 477 series of call options listed during the Class Period) and 351 different series of Shire put options (approximately 73.6% of the 477 series of put options listed during the Class Period) *did not trade at all* in the Class Period. Thus, the level of trading activity for those 736 series of Shire options is completely irrelevant to an analysis of market efficiency for the 92 series of Shire call options and 126 series of Shire put options that

[28] Kleidon Report Section IV.

[29] Coffman Efficiency Report ¶¶ 27-31.

[30] Kleidon Report Section IV.A.1 and Kleidon Report Exhibits 3-5.

did trade during the Class Period. Excluding the untraded options has no impact on market efficiency for the options at issue.

38. In other words, if there was no trading in a particular option series during the Class Period, then no Class member purchased those options and no Class member suffered damages thereby, so considering whether the markets for those particular series of Shire Options were efficient is a wasted exercise.

39. However, analyzing the trading activity of the 24 Shire Option series that represent roughly 88% of the net increase in open interest and over 76% of the trading volume during the Class Period shows substantial trading activity that supports my conclusion that those option series traded efficiently, as I describe below.[31]

40. **Exhibit 3** lists each of the Sample Options and summarizes the total volume during the Class Period and the percentage of days during the Class Period the option traded. This table shows that 6 of the 24 options traded on at least 75% of the 12 trading days in the Class Period and 11 of 24 traded on more at least half of those trading days. Even the least-traded option traded more than 400 option contracts (the equivalent of over 40,000 ADS shares) during the Class Period. In total, for the 24 Sample Options, 45,619 contracts (or the equivalent of 4,561,900 ADS shares) traded during the Class Period. This trading volume is depicted on each of the individual charts on **Exhibits 1A-1X**.

41. This additional evidence that there was substantial trading in the relevant option series during the Class Period in conjunction with the other factors I have analyzed, including strong evidence for cause and effect, provides strong evidence of market efficiency.[32]

[31] I note again that Dr. Kleidon has *not* expressed an opinion that *any* series of Shire Options traded inefficiently.

[32] Dr. Kleidon also notes that Shire Options have bid-ask spreads that are wider than the bid-ask spread for Shire ADSs and this implies higher trading costs and more room for inefficient pricing. It is not at all unusual for option

B. DR. KLEIDON'S CRITICISMS OF MY PROPOSED DAMAGES METHODOLOGY ARE SIMILARLY MISPLACED

42. Dr. Kleidon's opinion that I failed to articulate a damages methodology is simply incorrect. I addressed the question of damages in Section IX of my Efficiency Report by articulating that damages will be calculated using the standard and well-accepted out-of-pocket methodology that is ubiquitous in securities class actions such as this, namely that damages are equal to the artificial inflation at time of purchase minus the artificial inflation at time of sale (or the artificial inflation at time of purchase if the share remains unsold).

43. Notably, Dr. Kleidon does not dispute that this is the proper damages methodology or that it can be applied on a class-wide basis. Instead, Dr. Kleidon raises speculative questions about (1) how Lead Plaintiffs might analyze and prove loss causation at trial; (2) what information will ultimately be shown by Lead Plaintiffs to represent corrective versus not corrective information; and (3) how and whether Lead Plaintiffs would need to disaggregate information disclosed on the alleged corrective disclosure of October 15, 2014.[33] These are all specific questions to be addressed in a detailed loss causation analysis to *quantify* the appropriate inflation per share during the merits phase of the litigation, not whether there is a well-accepted damages methodology that is applicable on a class-wide basis.

44. In particular, Dr. Kleidon mischaracterizes my Efficiency Report and opinion when he states that the report "implies that [Coffman] will measure the amount of inflation at the start of and throughout the putative class period based on the Shire-specific price decline that his

securities to have much wider spreads than the underlying equity securities they reference; however, based on my analysis of the other factors described in my Efficiency Report and above, this factor does not alone suggest the options traded inefficiently.

[33] Kleidon Report ¶¶ 88-95.

event study estimates for Shire ADSs at the end of the putative class period . . . ."[34] My Efficiency Report does *not* imply that would necessarily be the appropriate quantification of inflation, and his attacks on this proverbial straw-man are irrelevant. While I did state that an event study (which has already been provided for Shire ADSs specifically) would likely be an important input to the analysis, to quantify the inflation requires a detailed loss causation analysis that would include an analysis of any potentially confounding information as well as an analysis of how the value of the alleged misrepresentations and omissions might have changed during the Class Period.

45. Dr. Kleidon's speculation about whether, and to what degree, the price decline on October 15, 2014 was caused by the alleged misstatements and omissions and how to properly disaggregate the October 15, 2014, price decline between fraud-related and non-fraud-related information raises classic loss causation questions present in virtually every securities class action. These issues are regularly the subject of discovery during the merits phase of the litigation. The specific quantification of inflation is potentially dependent on information obtained during discovery and will be determined based upon proof (including discovery information) that is common to all class members.

46. For example:

a. In almost every case there is a dispute about whether the newly released information that is alleged to be corrective is confounded by other newly released, company-specific information unrelated to the fraud.

b. In almost every case there is a battle of the experts at the merits stage regarding what information is confounding and how to reasonably estimate the value of the

[34] Kleidon Report ¶ 89.

potentially confounding information.

c. The only necessary input to the class-wide damages model to adjust for confounding information is calculating the percentage of the abnormal return from the event study that was caused by the confounding information, as opposed to the corrective information, which requires a detailed loss causation analysis.

d. I further understand that once a loss causation analysis is performed during the merits phase of the litigation, the percentage of confounding information (if any) does not need to be measured with precision, but only needs to be a reasonable approximation based on all relevant information, potentially including information obtained in discovery. I also understand that proving loss causation only requires that the alleged misconduct be a substantial factor in causing the abnormal price changes on corrective disclosure dates, not that it be the sole factor (*i.e.*, 100%) of the abnormal stock declines.

e. Whatever percentage of confounding information is determined to be reasonable, it can be applied on a class-wide basis within the general damages methodology already described in my Efficiency Report.

47. To be more specific, based on the information that has been provided to me to date, for this short 12-day Class Period, if asked to quantify artificial inflation I would expect to use a standard constant dollar back-casting methodology to compute artificial inflation. Assuming for the moment that there is corrective information revealed on October 14, 2014, I would perform a loss causation analysis to determine a per-share dollar amount of inflation revealed following the announcement after close of trading on October 14, 2014. In the absence of any contrary company-specific information during the short Class Period, I would assume that the amount of

inflation was constant throughout the Class Period.

a. Contrary to Dr. Kleidon's assertion, I would not necessarily use the dollar amount of the price change following the announcement on October 14, 2014, as a proxy or substitute for inflation in the market price. Rather, the price change is merely a starting point for calculating the amount of inflation in the market price.[35]

b. Likewise, contrary to Dr. Kleidon's assertion, I would not necessarily use the one-day price drop on October 15, 2014, as the starting point for calculating the amount of inflation in the market price. After conducting a detailed loss causation analysis following the close of discovery, I might determine that it is appropriate to use a multiple-day window, based on the market price change in the days following the disclosure on October 14, 2014, rather than the single-day price drop. However, that determination is intensely fact-specific, involving consideration of whether any other news in or events affecting the market on or after October 15, 2014, makes the single-day price drop or a multiple-day event window more appropriate to use as the starting point for a damages calculation.

48. Dr. Kleidon is also incorrect to state that I have not proposed a damages methodology for Options.[36] In fact, the very same damages methodology described in my Efficiency Report is applicable to Shire Options. While I did not specifically state that for sellers of put options the formula should focus on the change in artificial "deflation" rather than

[35] Even at that, the dollar amount of the price change is neither an upper nor a lower limit for the amount of inflation. If, based upon other news or events affecting the market on October 14, 2014, I find that there was no other reason to expect the price change, then the amount of inflation may not be any greater than the dollar amount of the price change. On the other hand, if I find that there were reasons to expect the market price to rise when the price actually fell, then I may determine that the amount of inflation may, in fact, be greater than the dollar amount of the price drop.

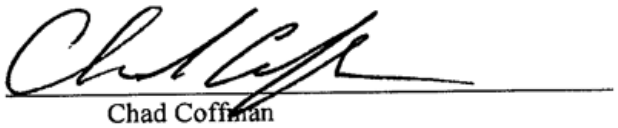
[36] Kleidon Report ¶ 96.

"inflation", the economic concept that the damages are based on the change in the distortion of the price caused by the misrepresentations or omissions is precisely the same. I clarified this at my deposition.[37] Again, Dr. Kleidon's arguments about precisely how I would quantify inflation (deflation) for each Shire Option series[38] (including whether it might be reliable to focus on changes in quoted prices as opposed to trading prices) is pure speculation on his part. My computation of the inflation in the ADSs and the Shire Options will be determined based upon a detailed loss causation analysis that is premature at this stage of the proceedings.

49. I reserve the right to amend this report to reflect new information that becomes available to me through the discovery process and/or from future rulings from the Court.

50. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on June 14, 2018

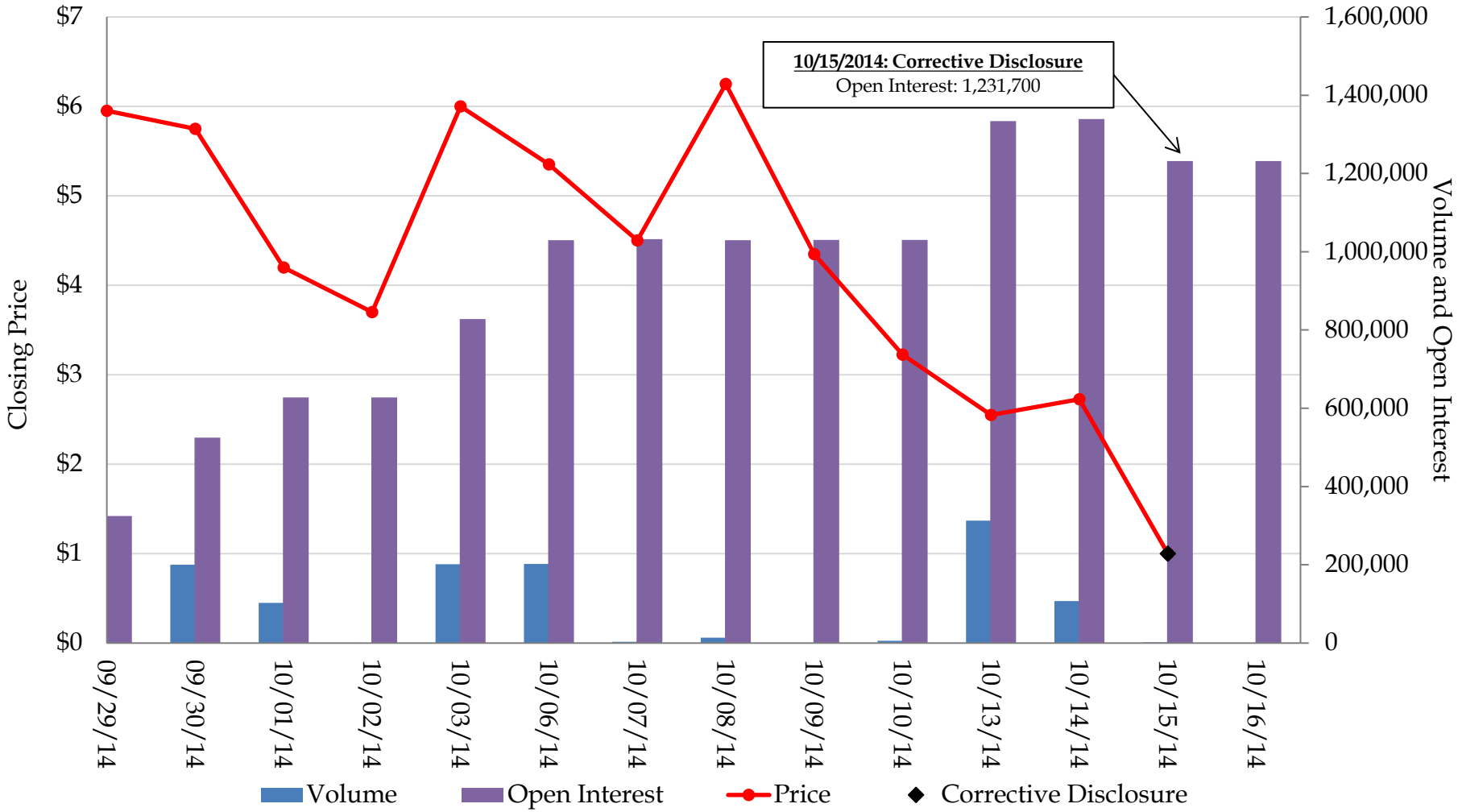


Chad Coffman

[37] Deposition of Chad Coffman, CFA, February 22, 2018, pp. 138:13-143:9.

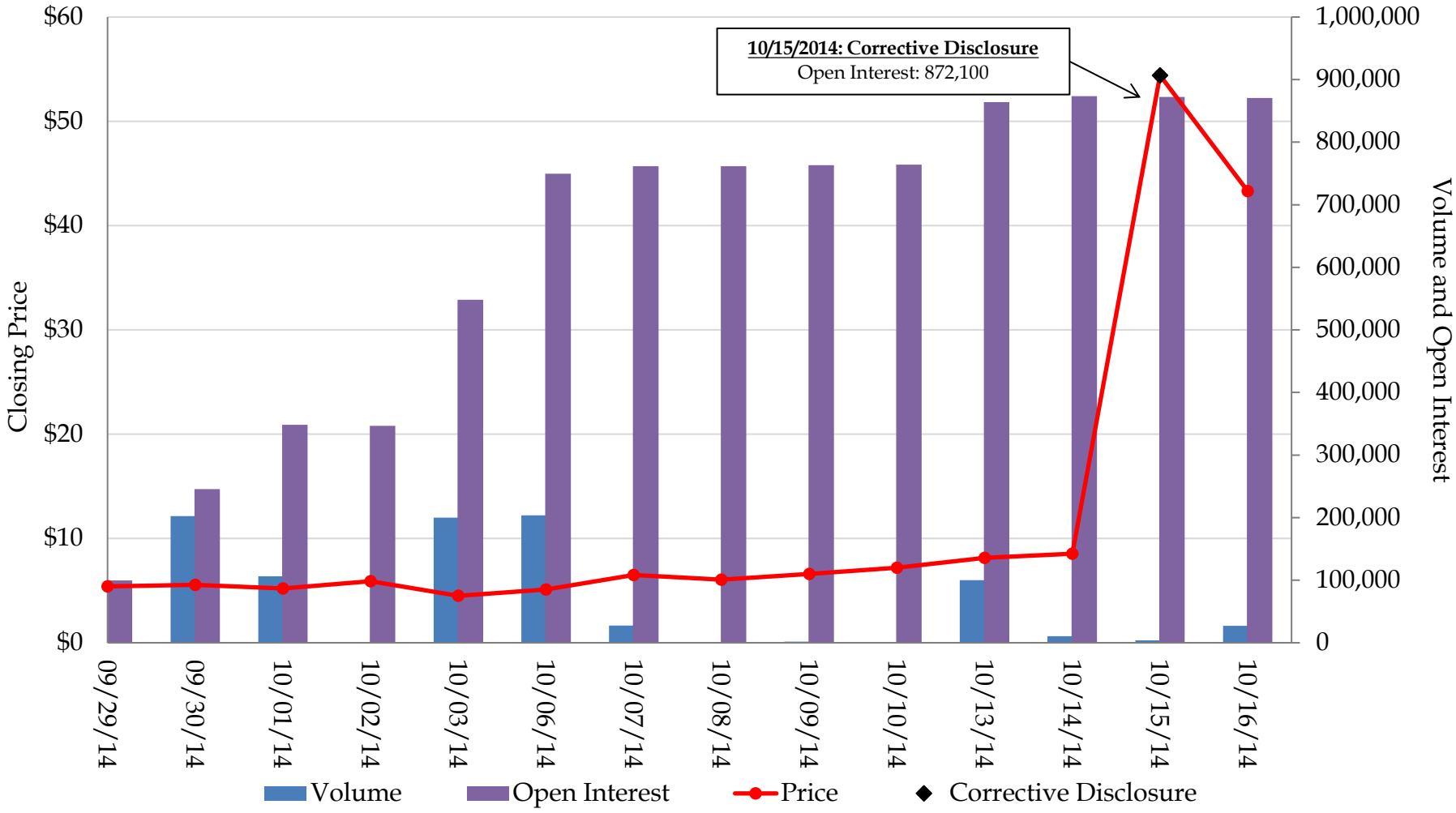
[38] Kleidon Report ¶¶ 97-98.

Exhibit 1A
Call Option, $280 Strike Price, 1/17/2015 Expiration
9/29/2014 - 10/16/2014



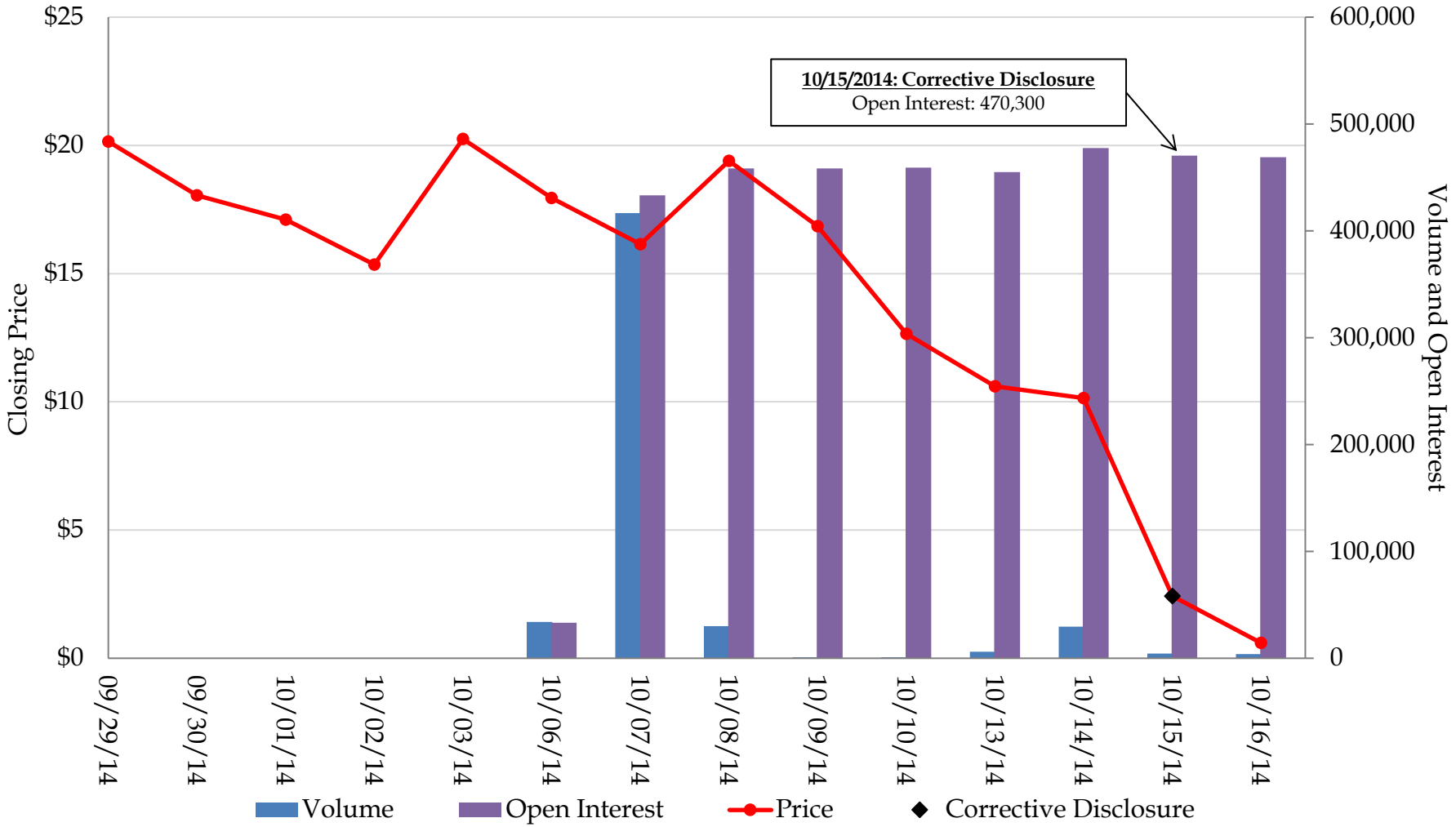
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1B
Put Option, $220 Strike Price, 1/17/2015 Expiration
9/29/2014 - 10/16/2014



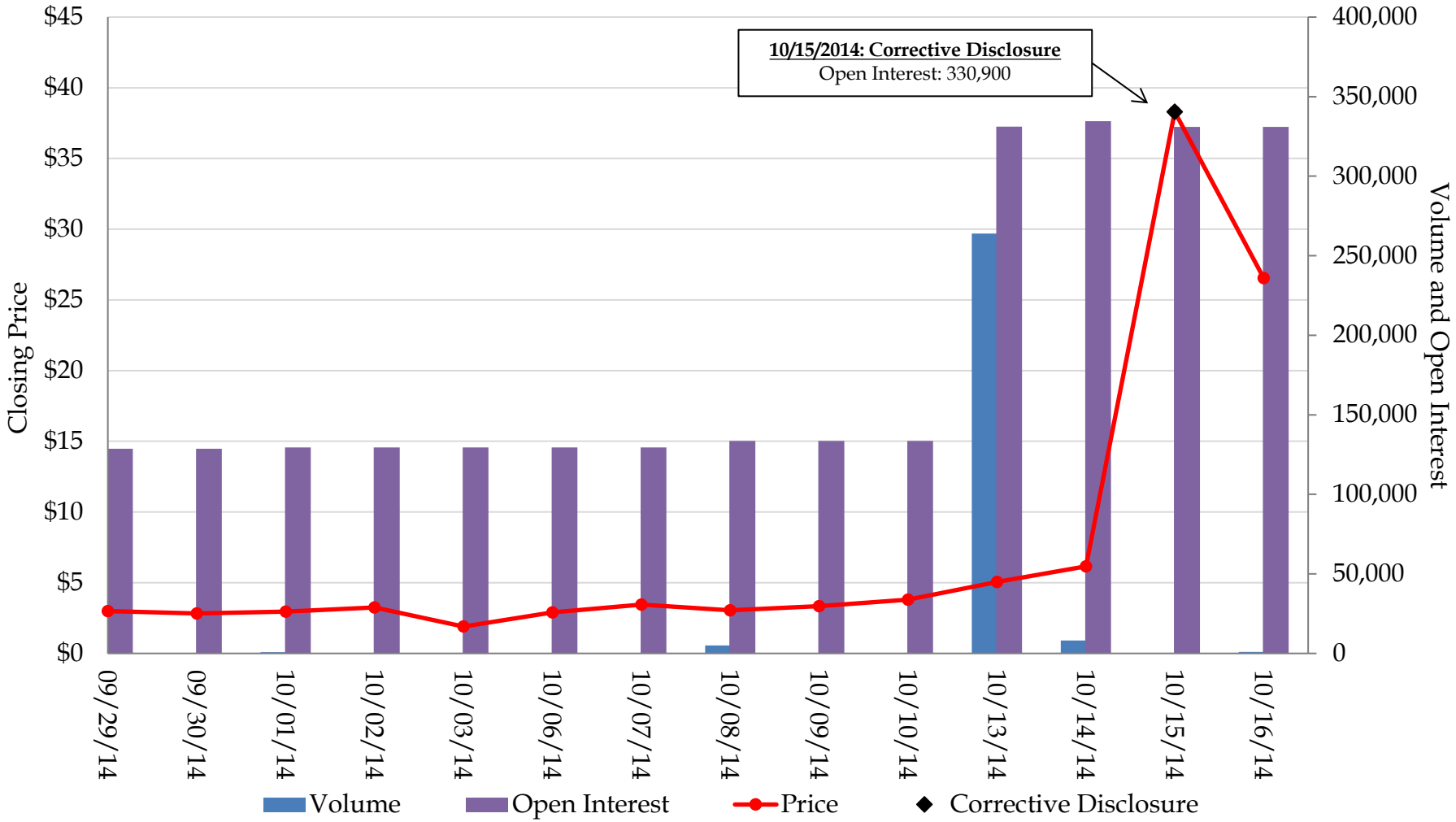
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1C
Call Option, $250 Strike Price, 11/22/2014 Expiration
9/29/2014 - 10/16/2014



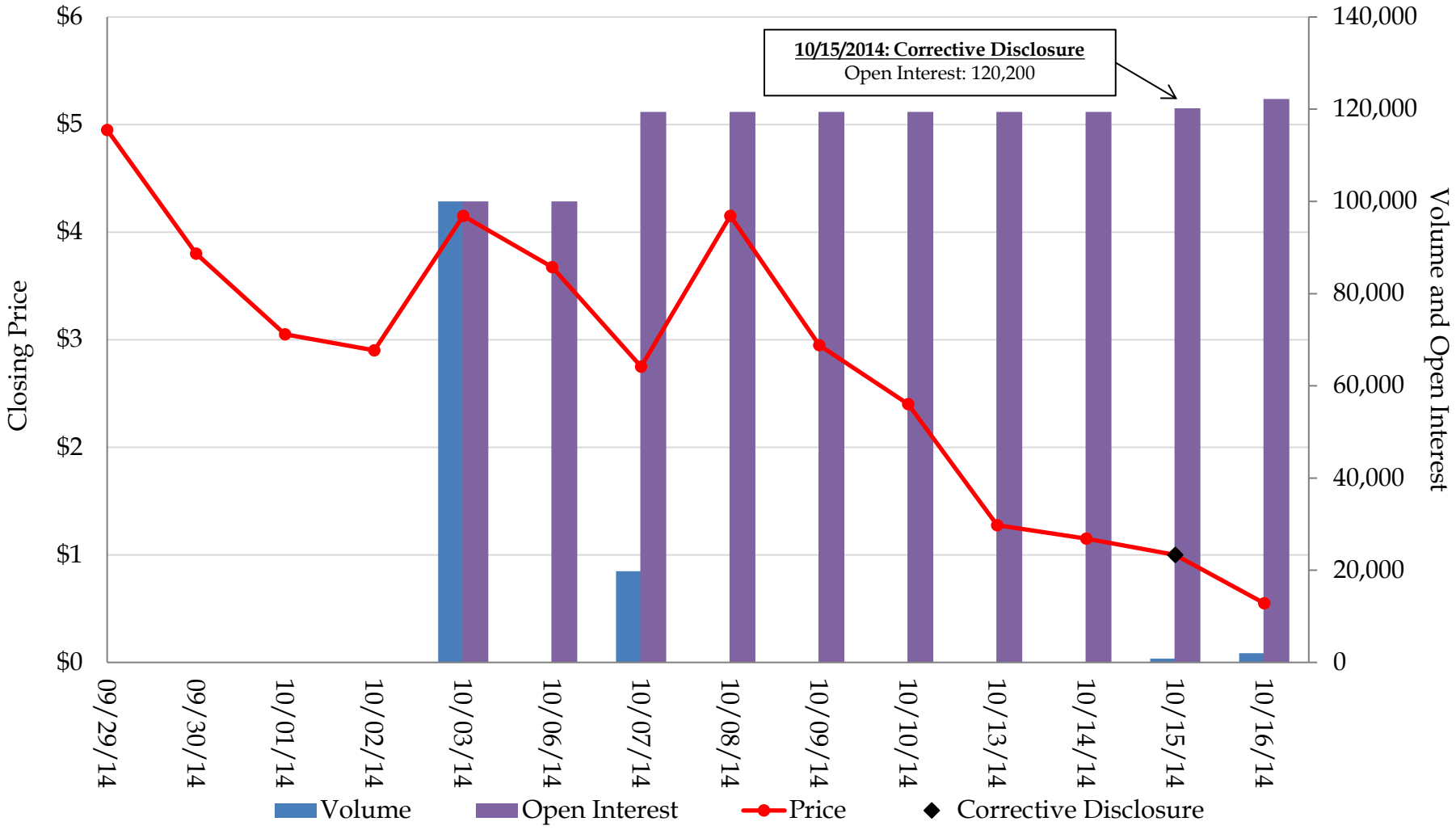
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1D
Put Option, $200 Strike Price, 1/17/2015 Expiration
9/29/2014 - 10/16/2014



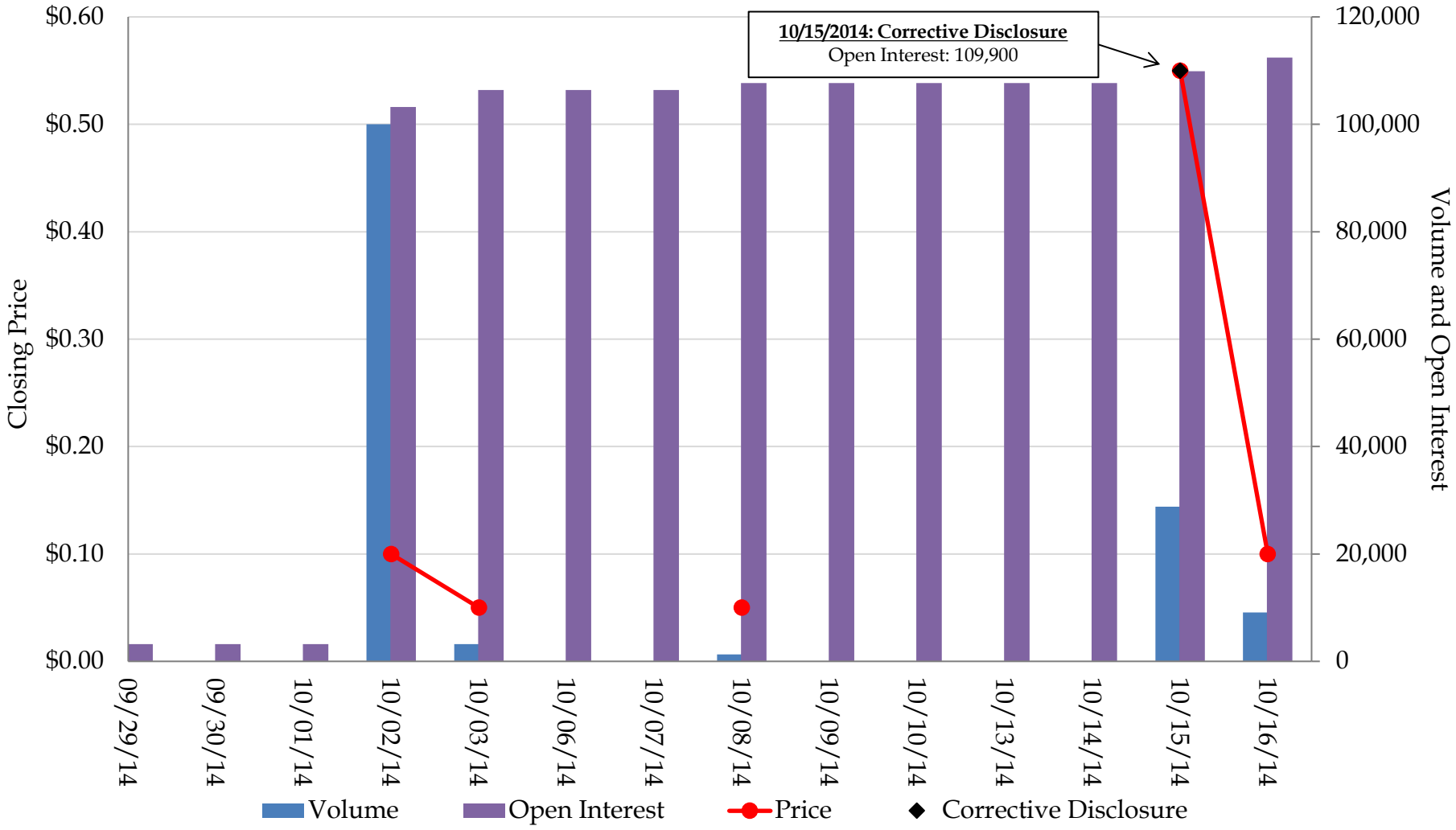
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1E
Call Option, $275 Strike Price, 11/22/2014 Expiration
9/29/2014 - 10/16/2014



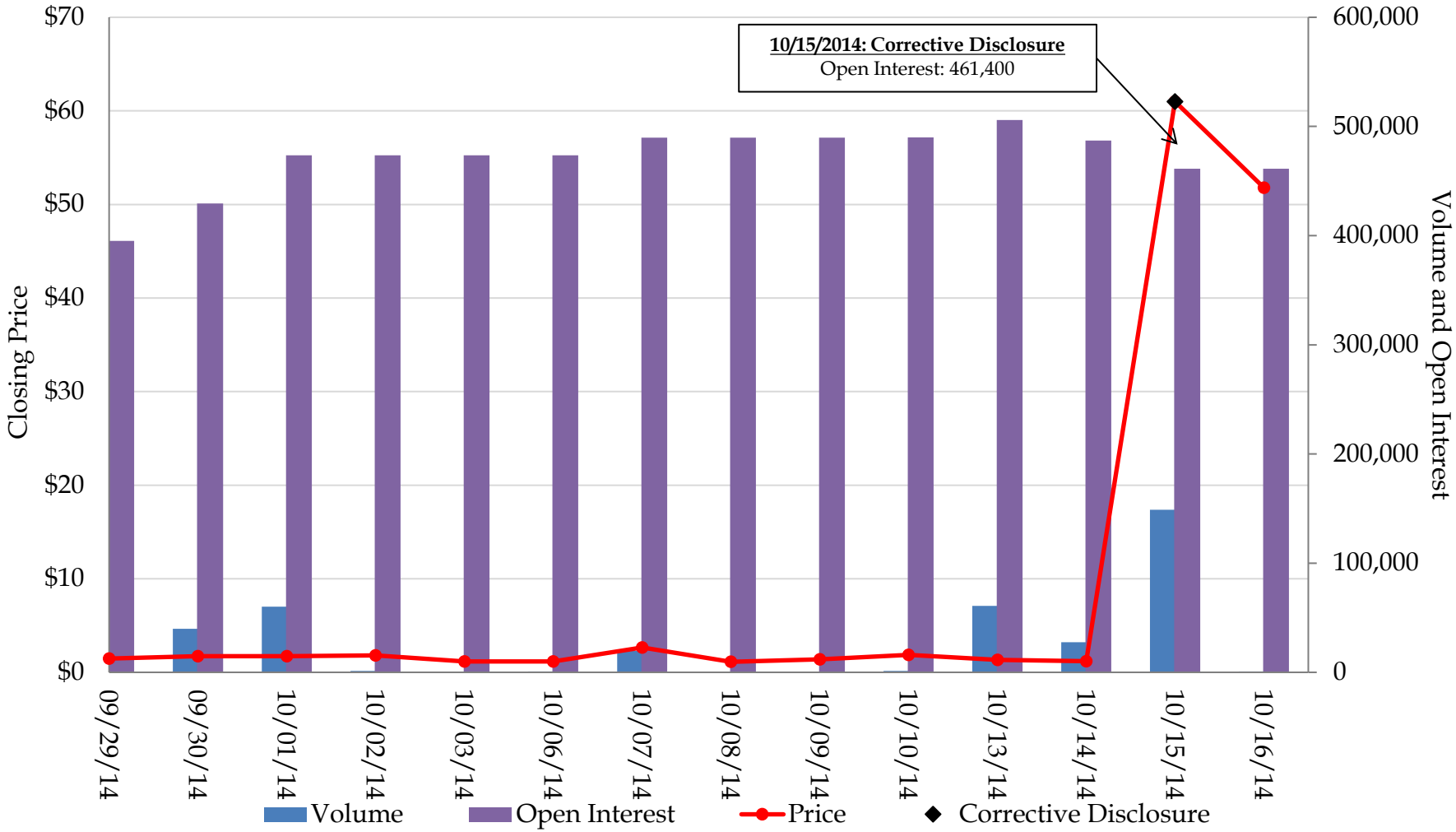
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1F
Put Option, $140 Strike Price, 10/18/2014 Expiration
9/29/2014 - 10/16/2014



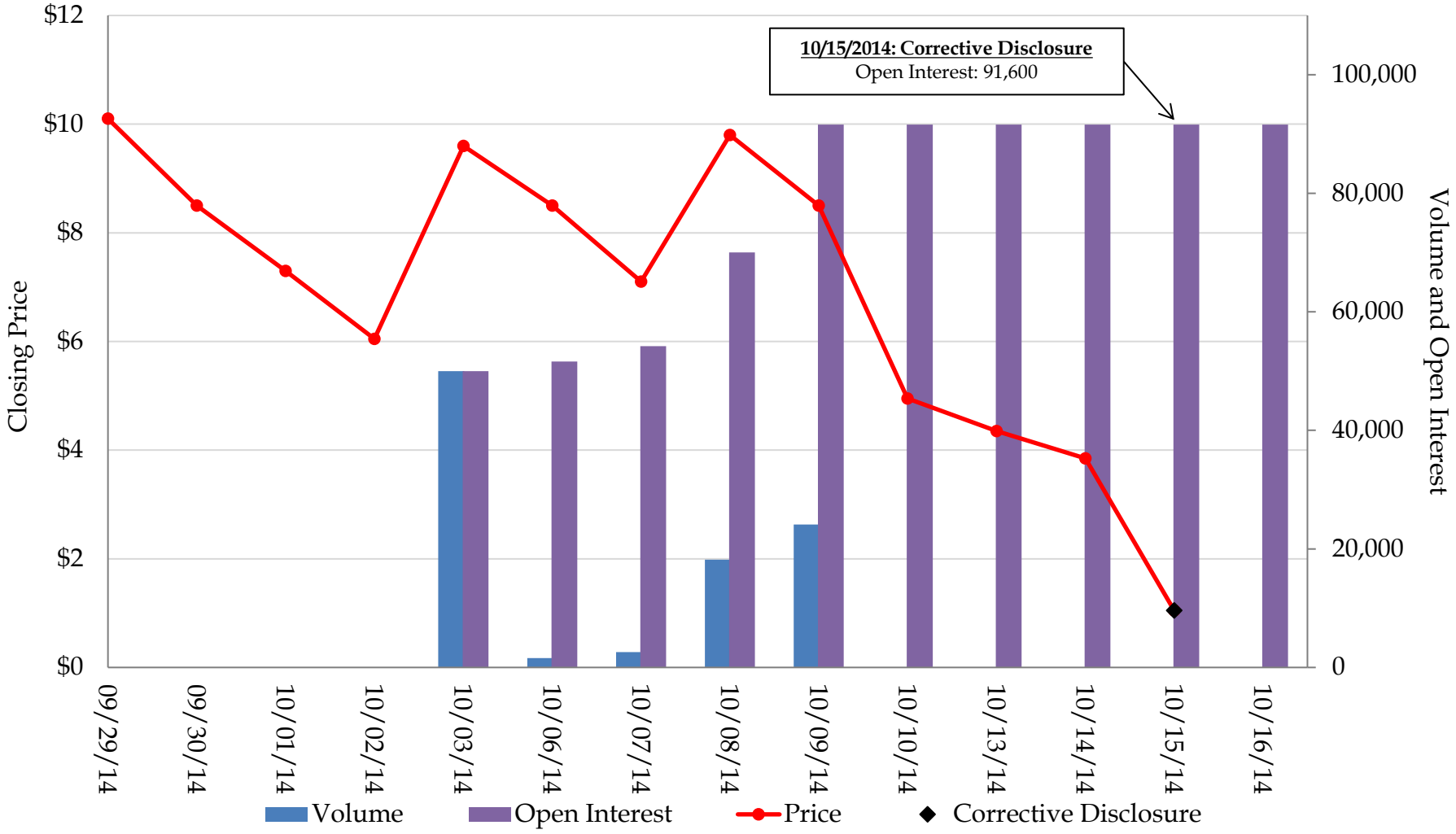
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1G
Put Option, $230 Strike Price, 10/18/2014 Expiration
9/29/2014 - 10/16/2014



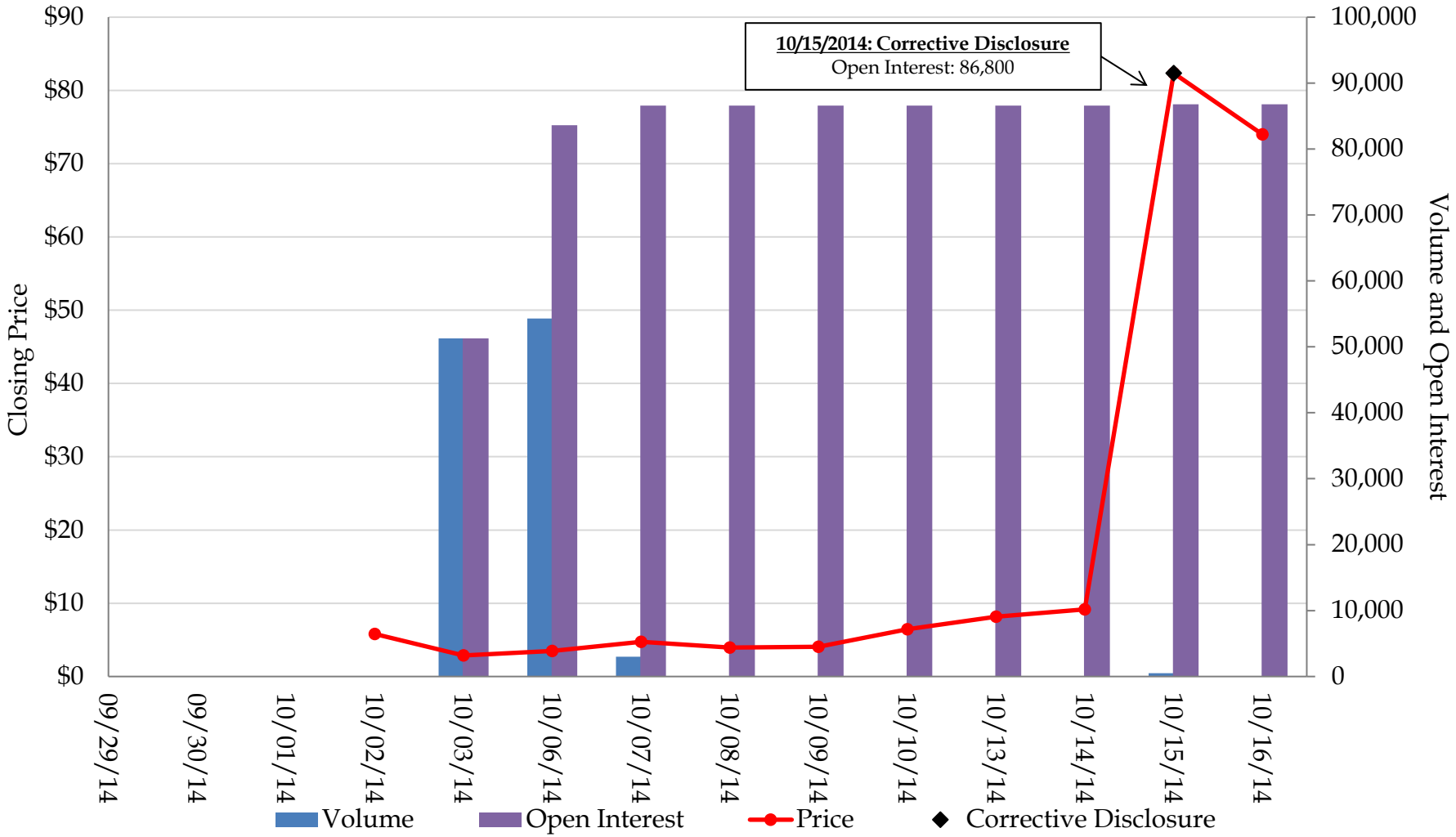
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1H
Call Option, $265 Strike Price, 11/22/2014 Expiration
9/29/2014 - 10/16/2014



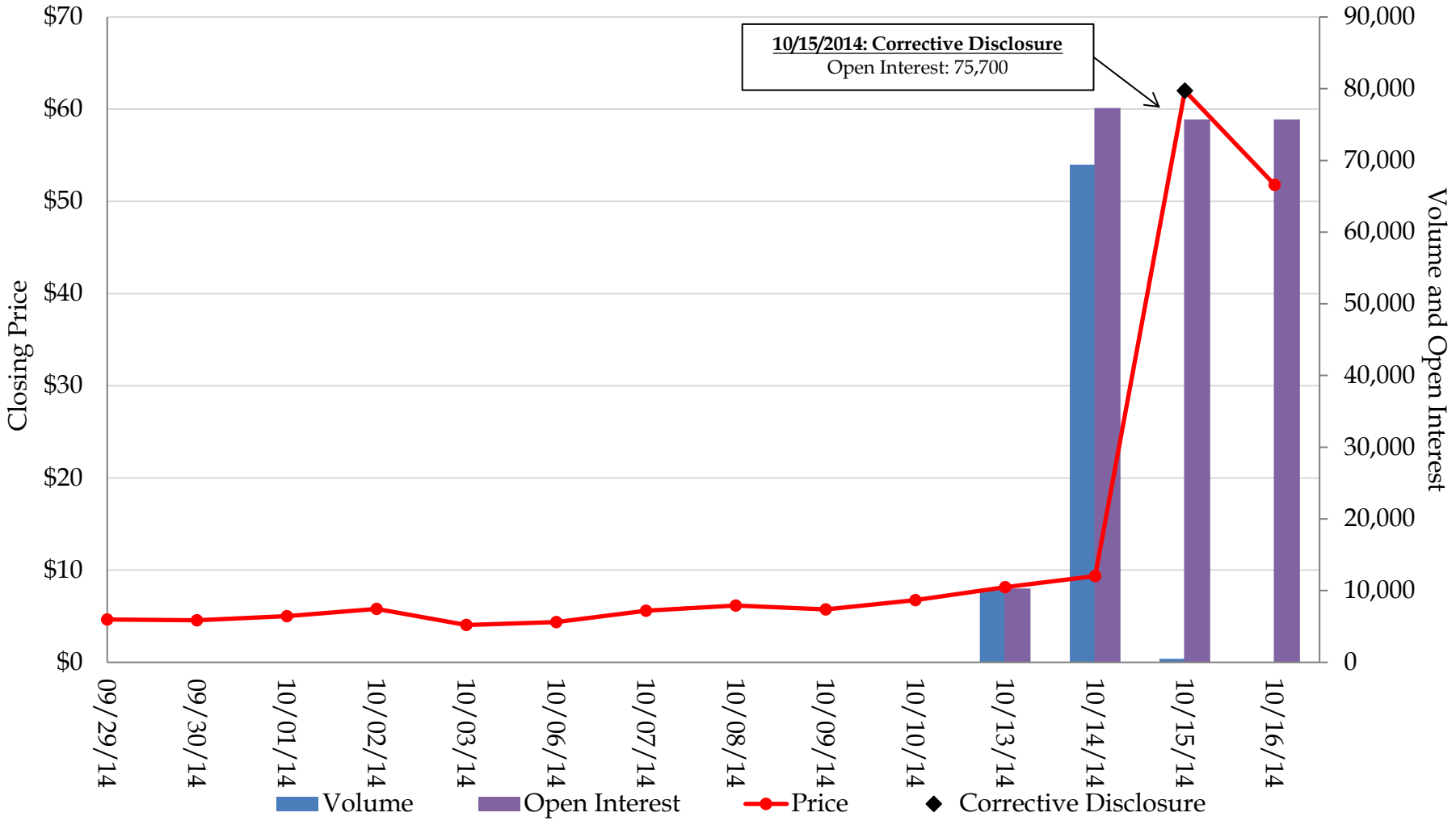
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1I
Put Option, $252.50 Strike Price, 10/18/2014 Expiration
9/29/2014 - 10/16/2014



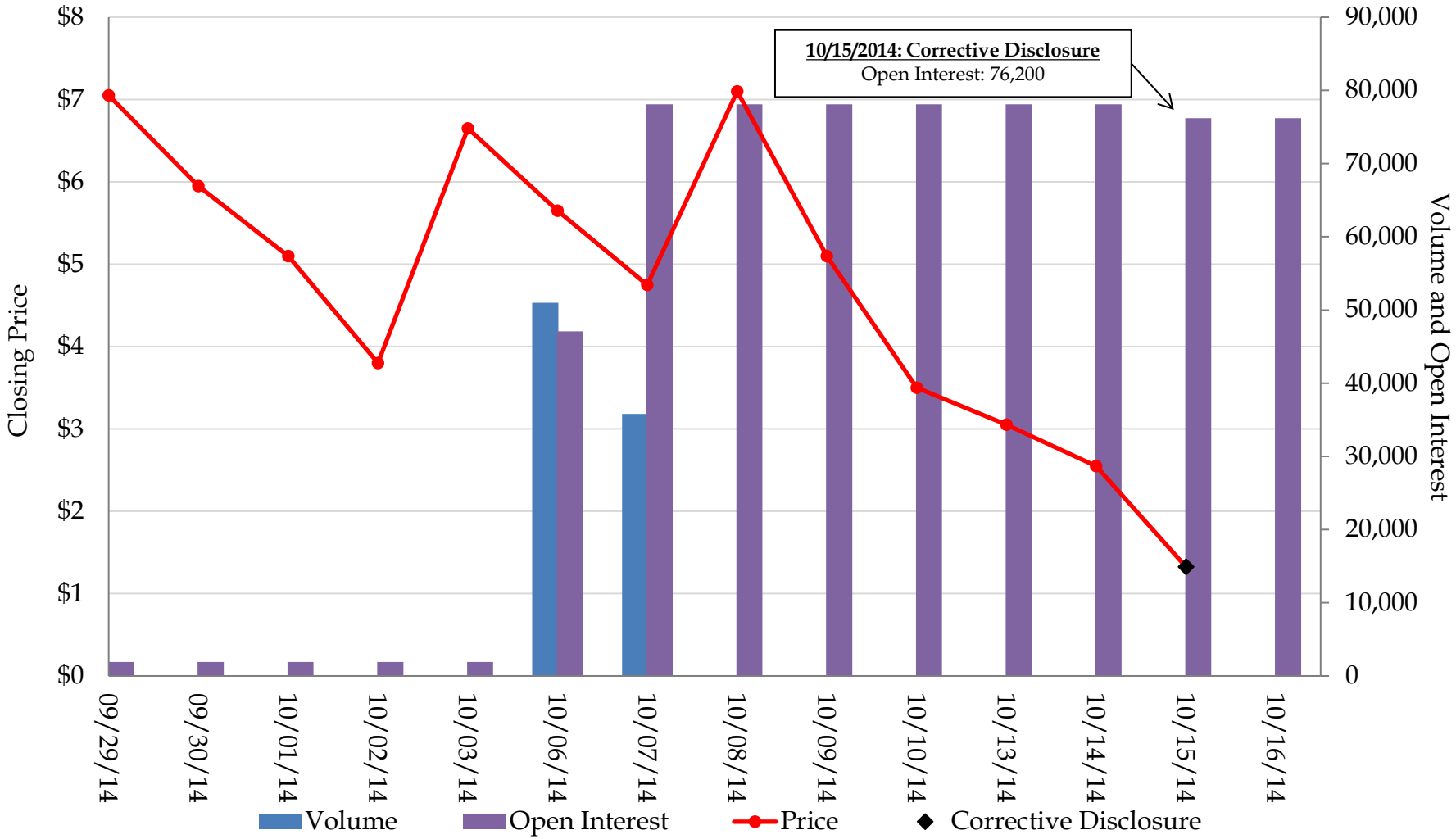
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1J
Put Option, $230 Strike Price, 11/22/2014 Expiration
9/29/2014 - 10/16/2014



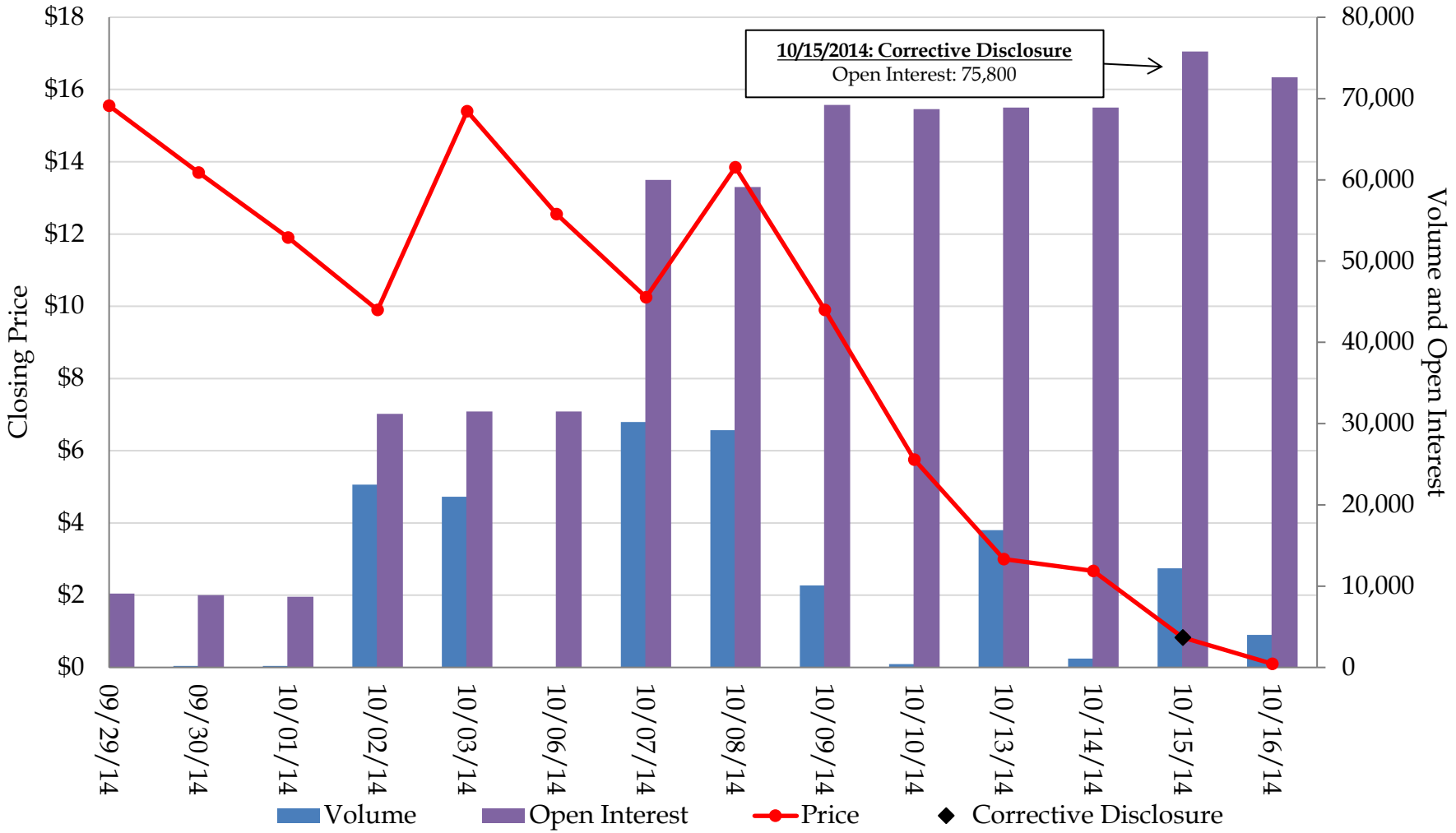
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1K
Call Option, $270 Strike Price, 11/22/2014 Expiration
9/29/2014 - 10/16/2014



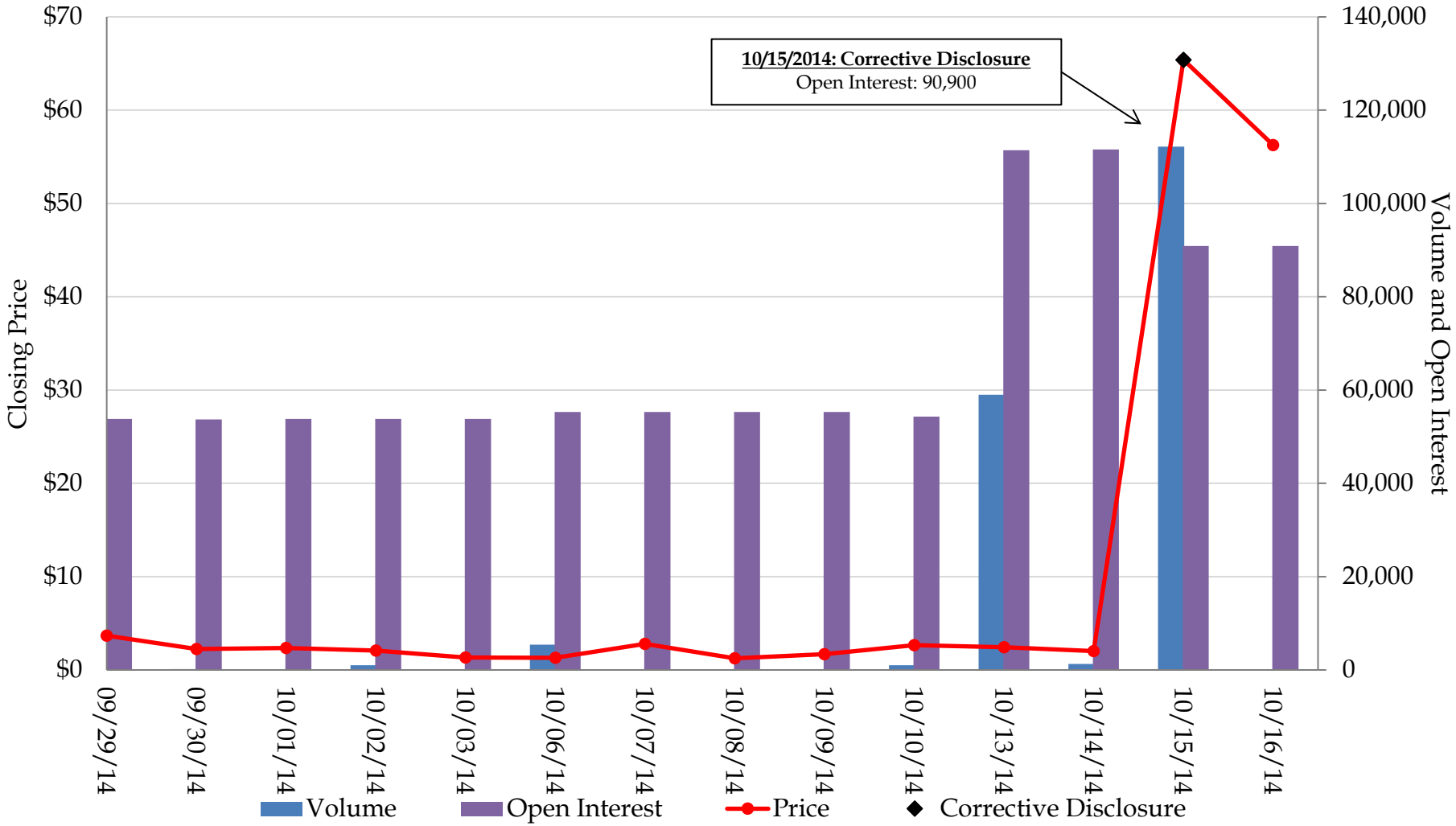
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1L
Call Option, $250 Strike Price, 10/18/2014 Expiration
9/29/2014 - 10/16/2014



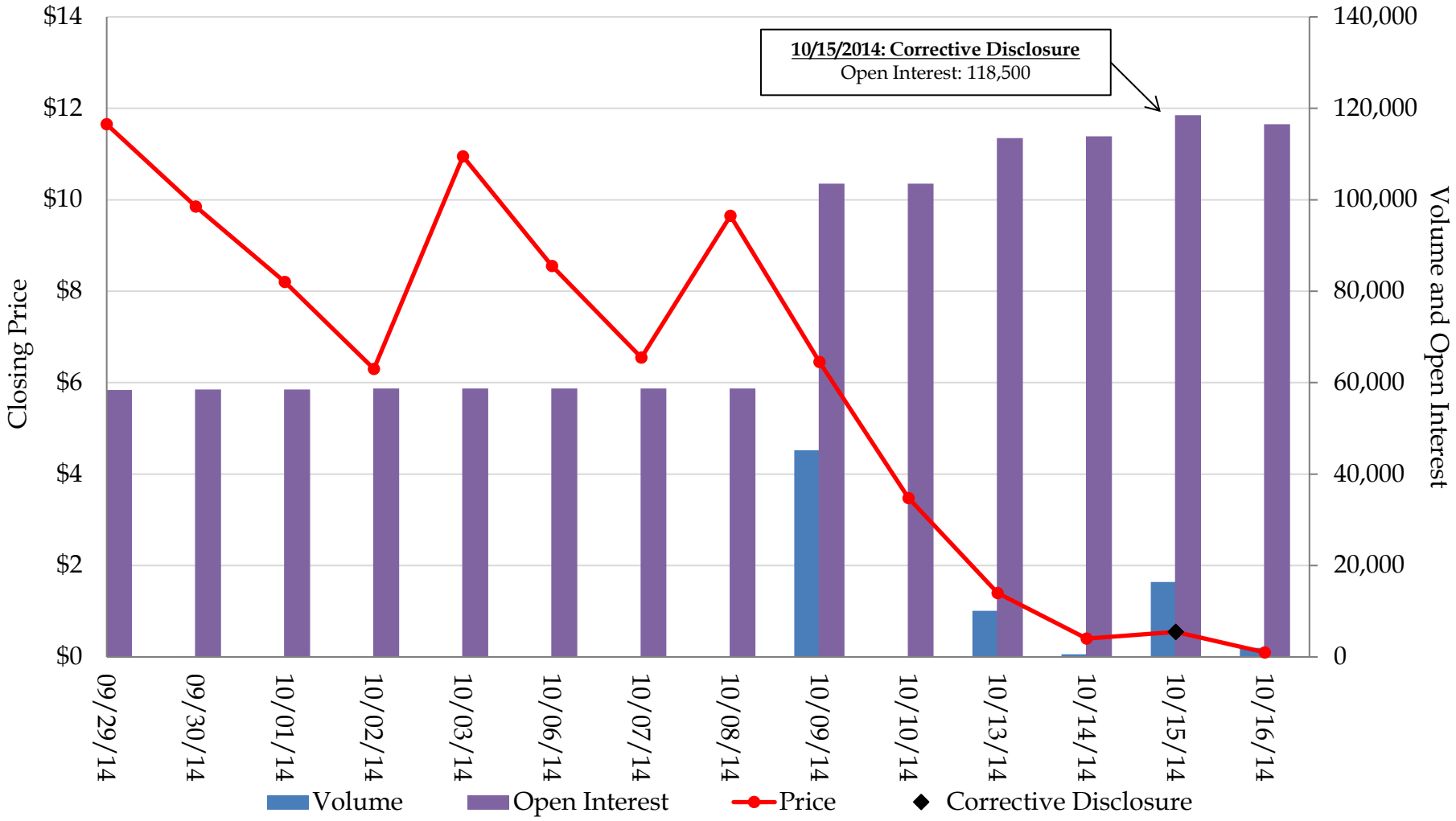
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1M
Put Option, $235 Strike Price, 10/18/2014 Expiration
9/29/2014 - 10/16/2014



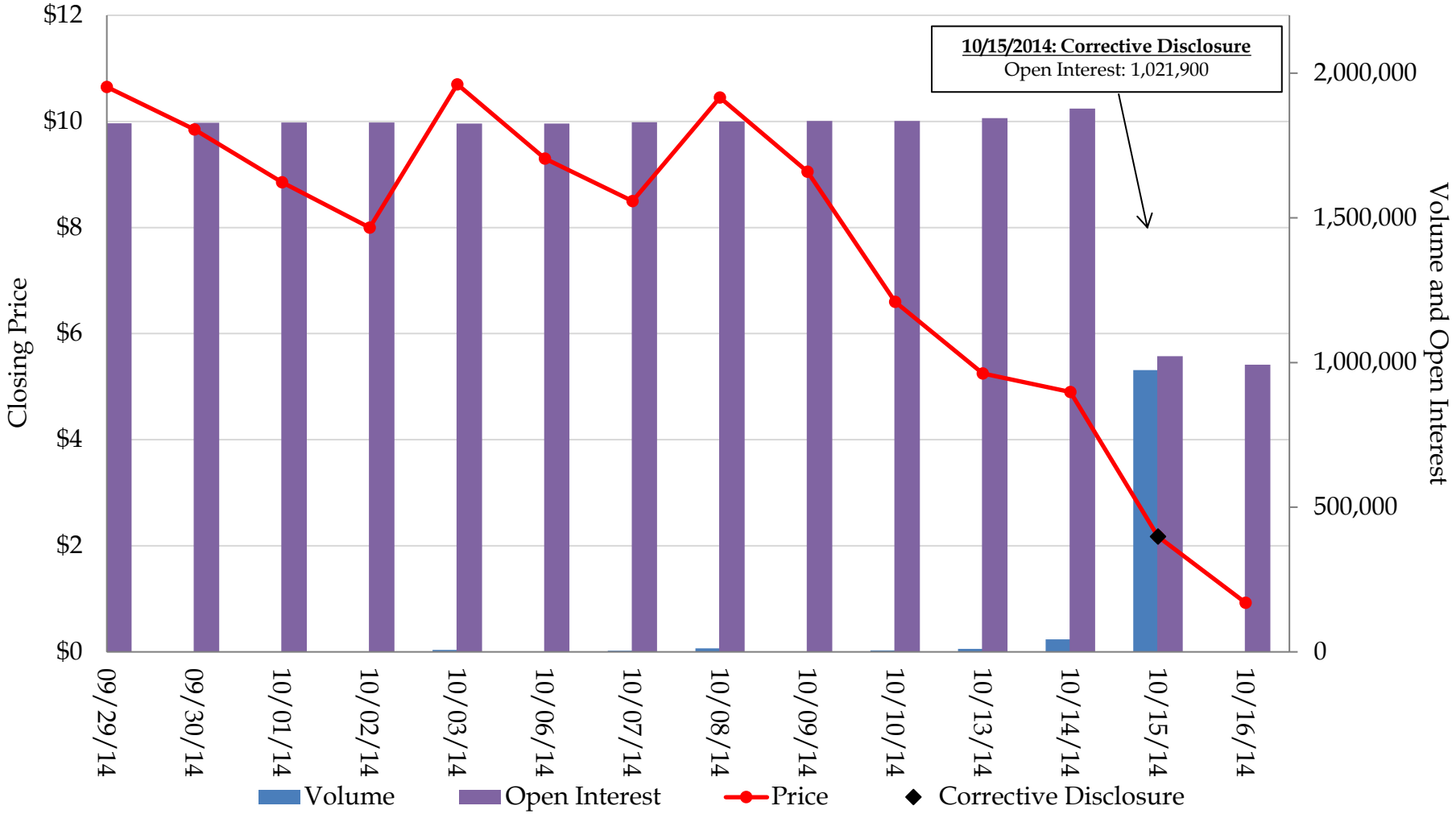
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1N
Call Option, $255 Strike Price, 10/18/2014 Expiration
9/29/2014 - 10/16/2014



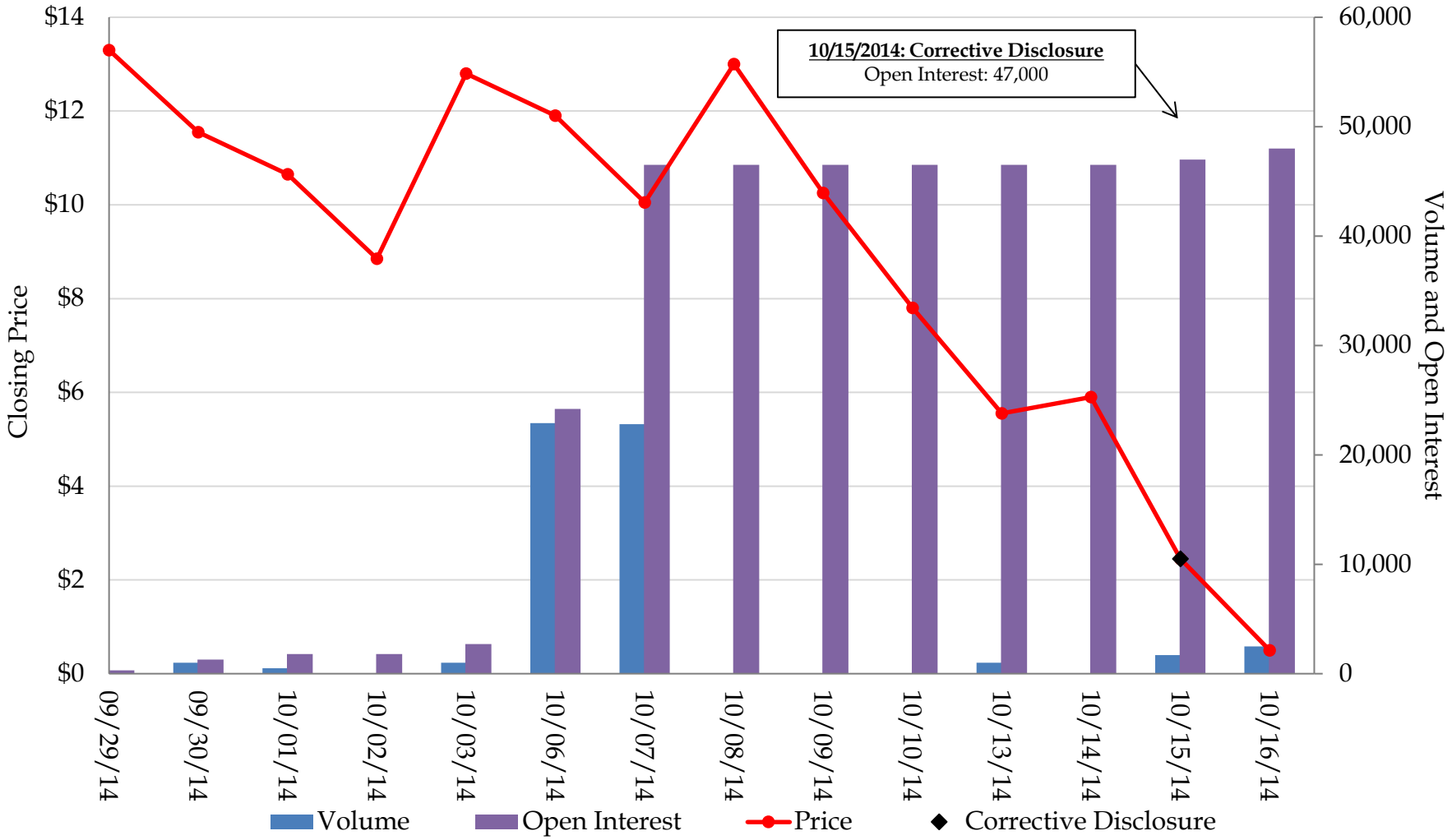
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1O
Call Option, $270 Strike Price, 1/17/2015 Expiration
9/29/2014 - 10/16/2014



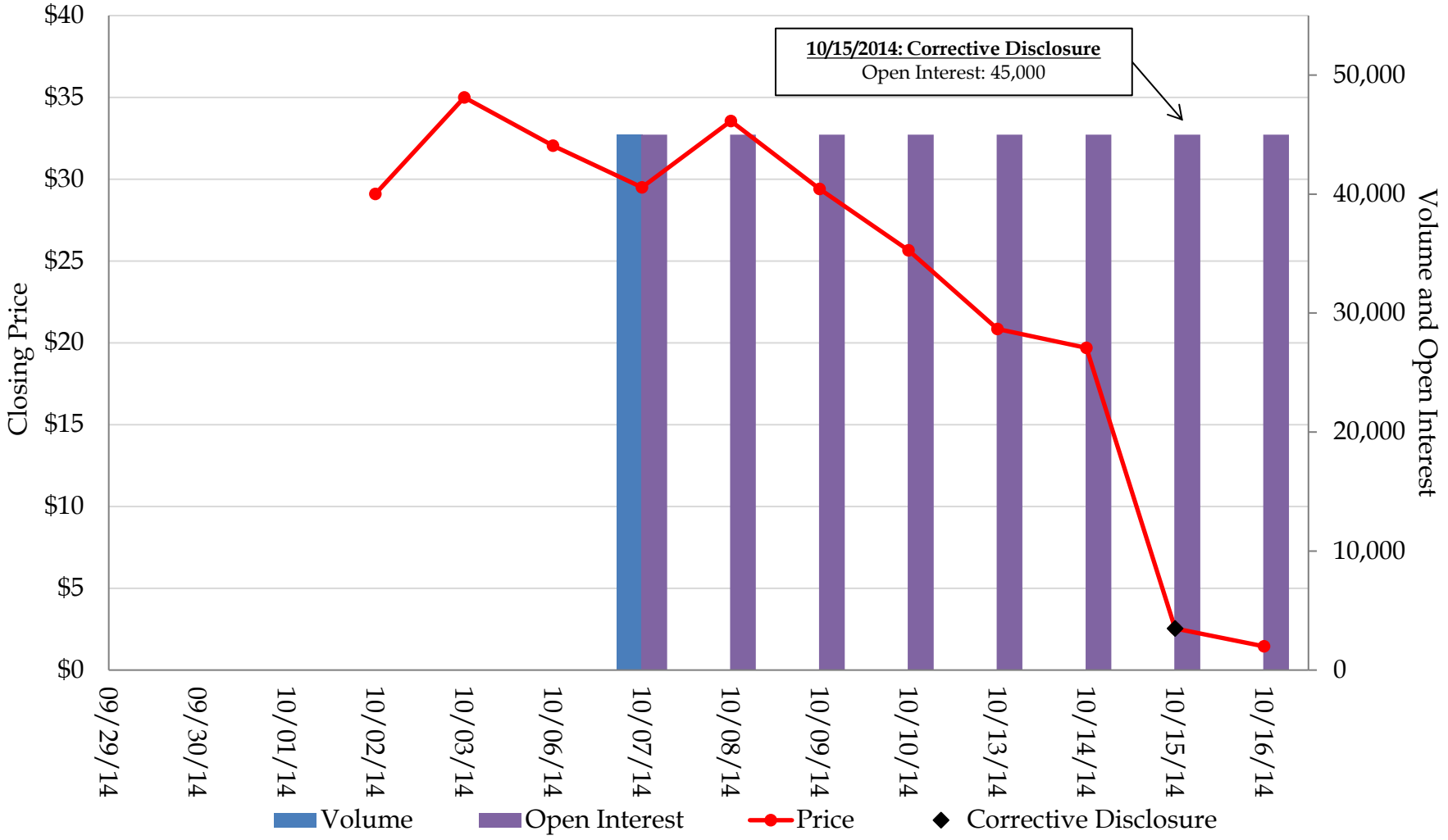
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1P
Call Option, $260 Strike Price, 11/22/2014 Expiration
9/29/2014 - 10/16/2014



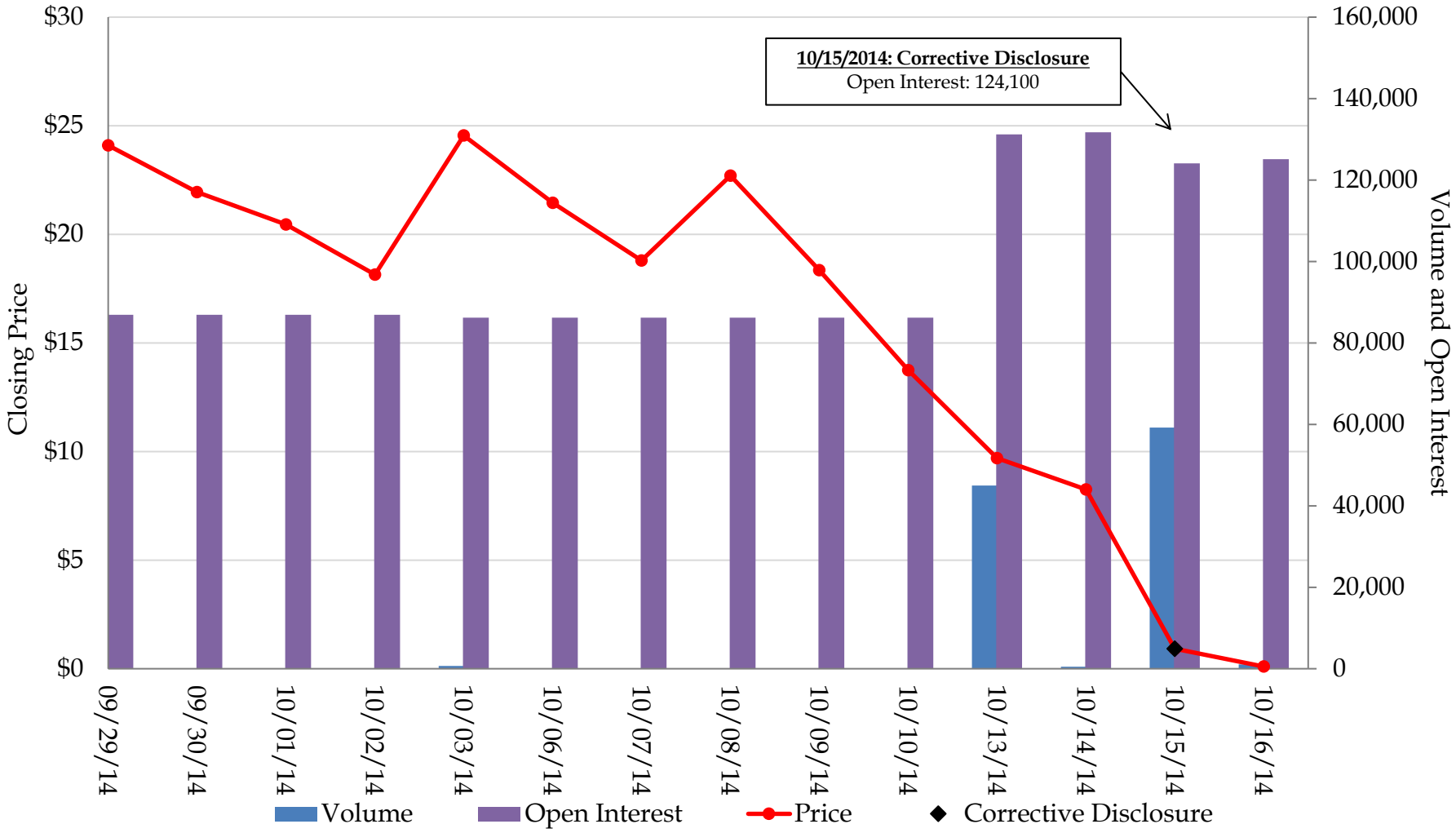
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1Q
Call Option, $230 Strike Price, 10/31/2014 Expiration
9/29/2014 - 10/16/2014



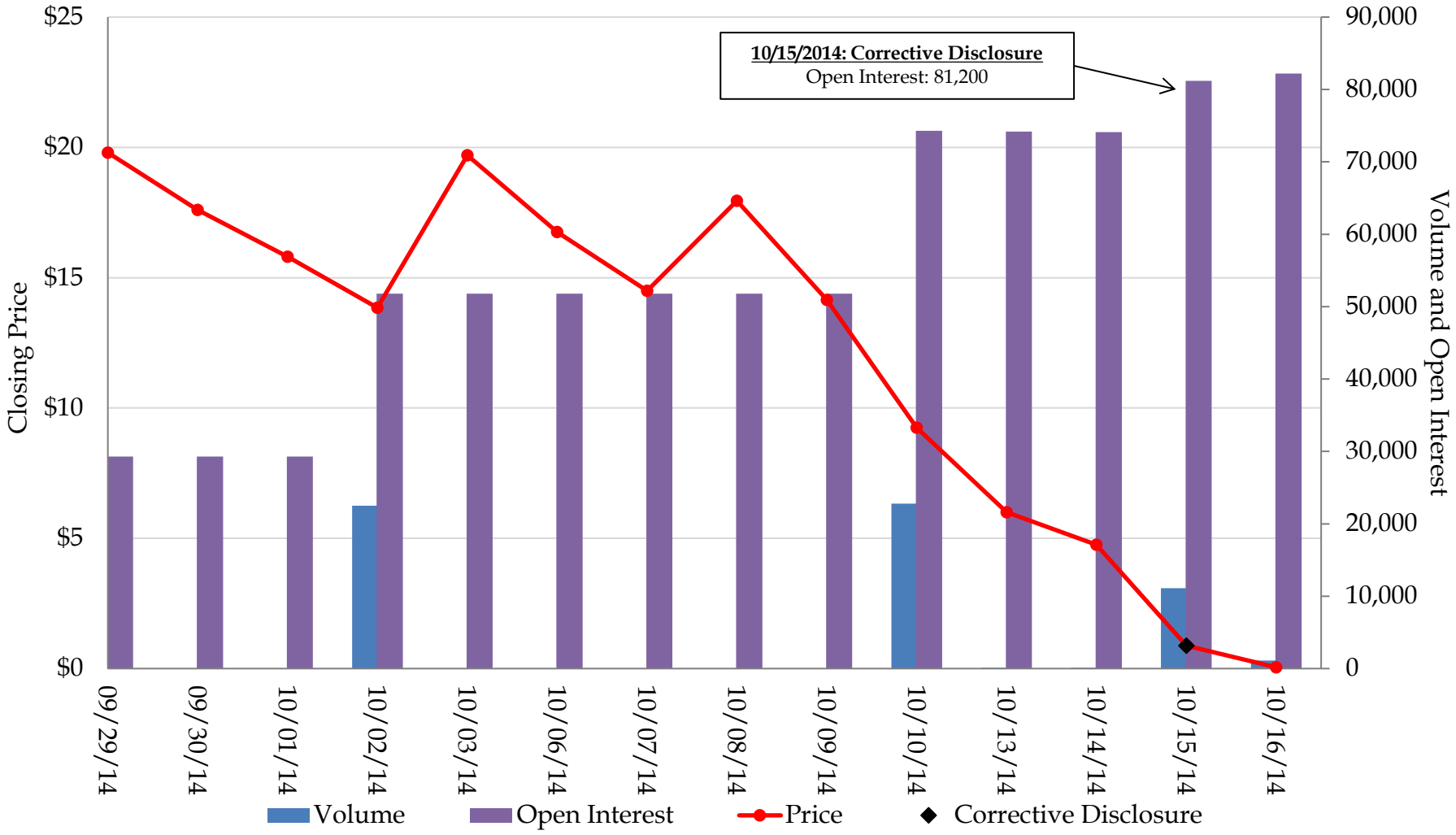
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1R
Call Option, $240 Strike Price, 10/18/2014 Expiration
9/29/2014 - 10/16/2014



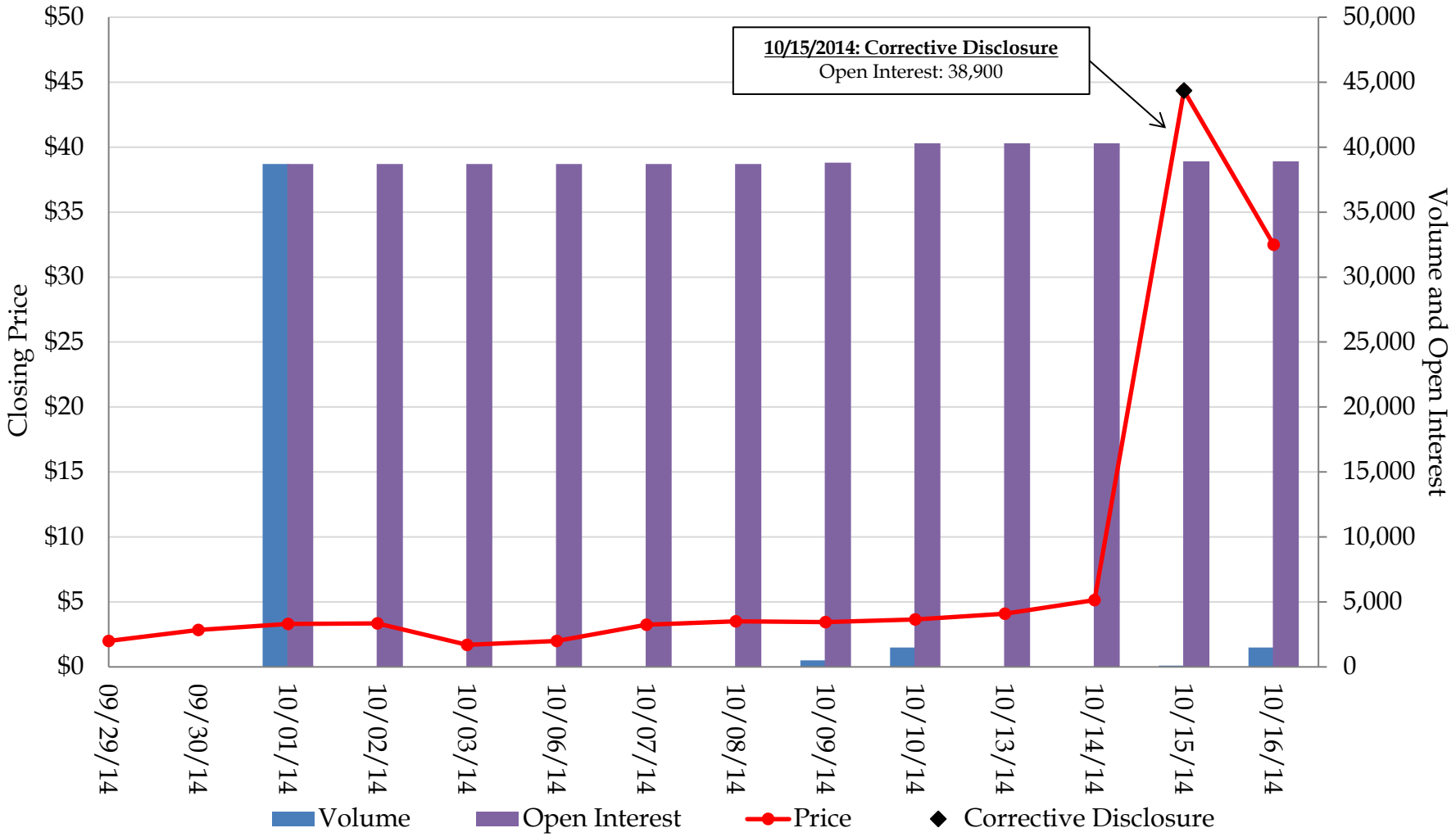
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1S
Call Option, $245 Strike Price, 10/18/2014 Expiration
9/29/2014 - 10/16/2014



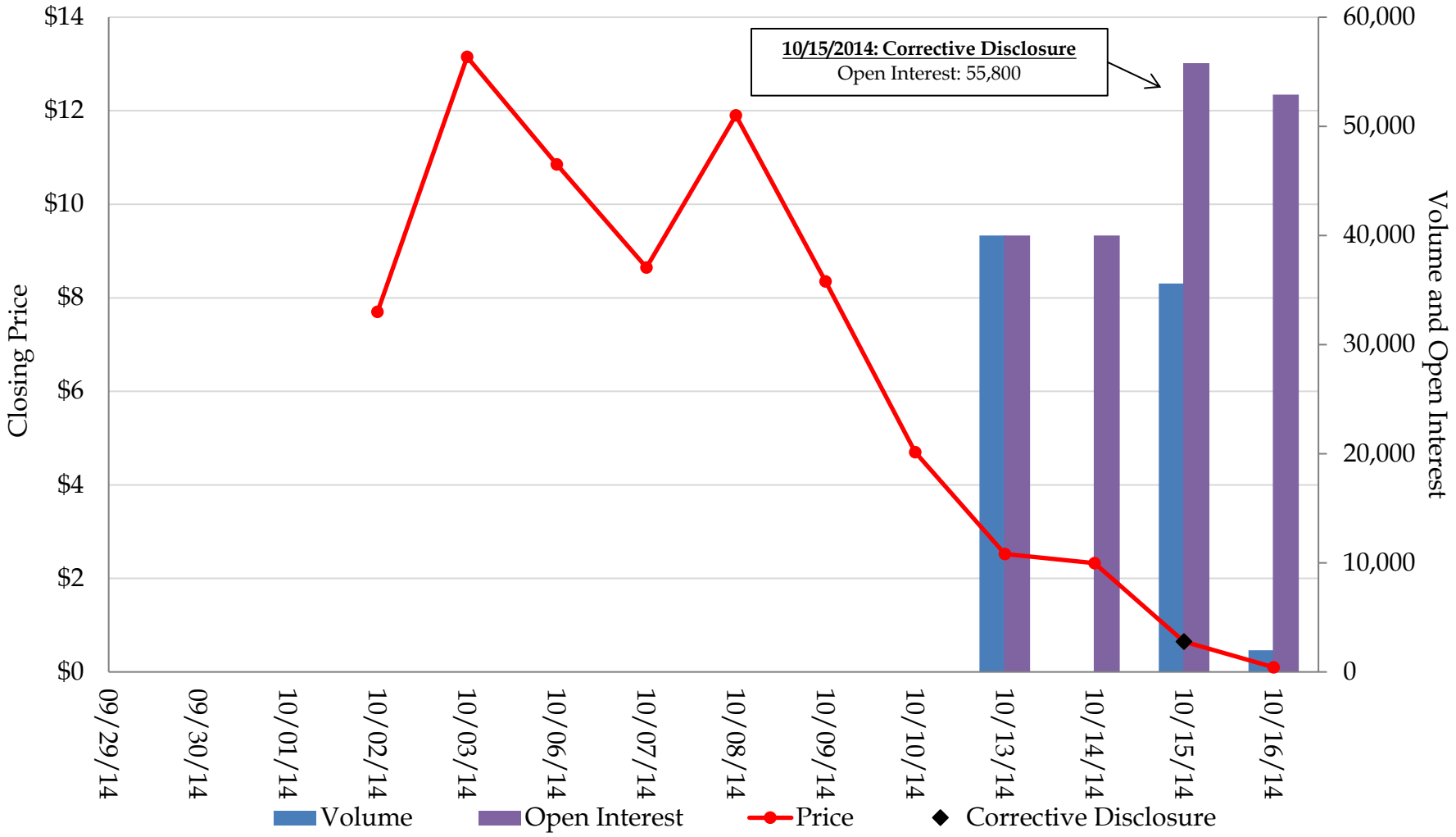
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1T
Put Option, $210 Strike Price, 11/22/2014 Expiration
9/29/2014 - 10/16/2014



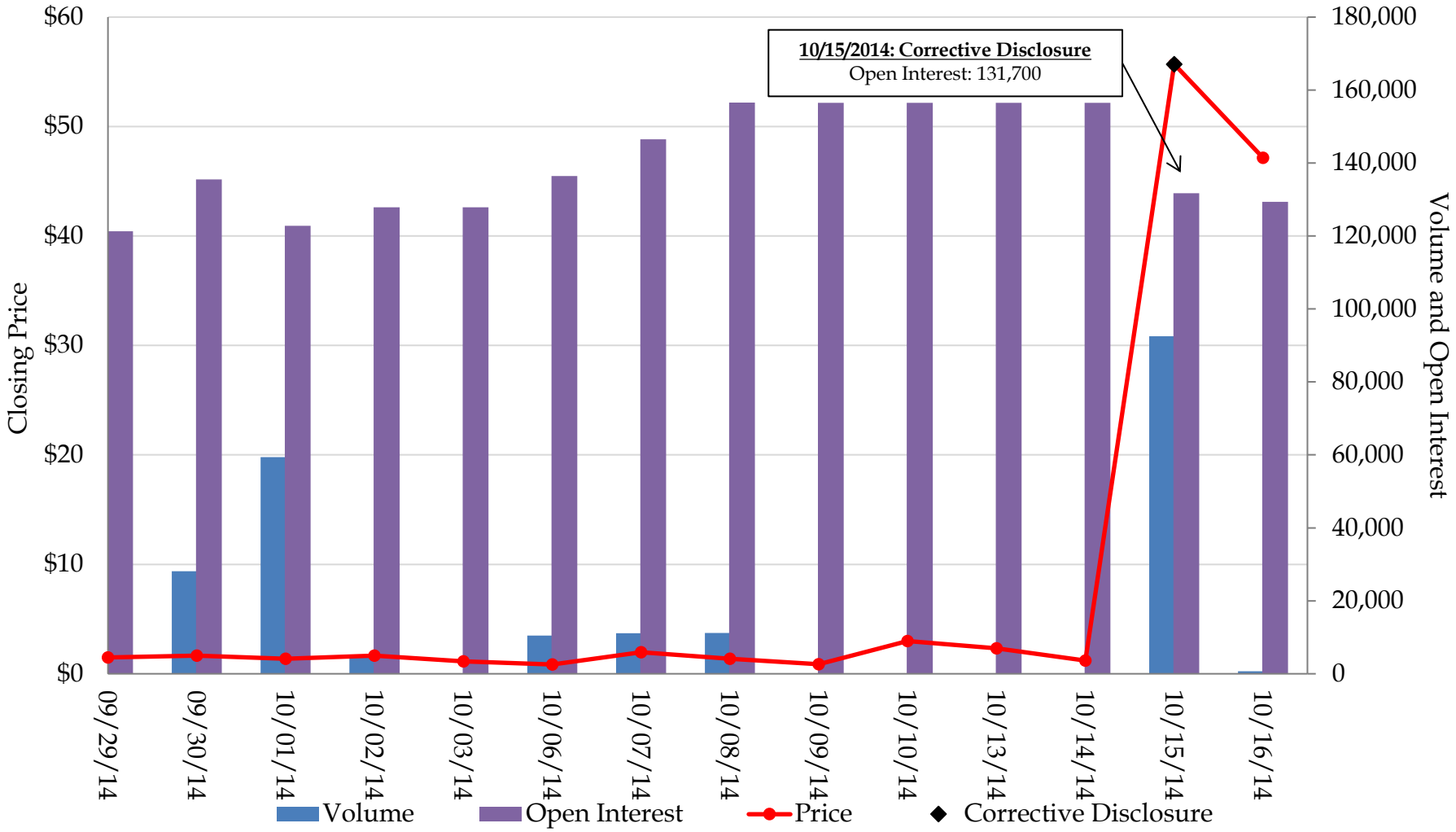
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1U
Call Option, $252.50 Strike Price, 10/18/2014 Expiration
9/29/2014 - 10/16/2014



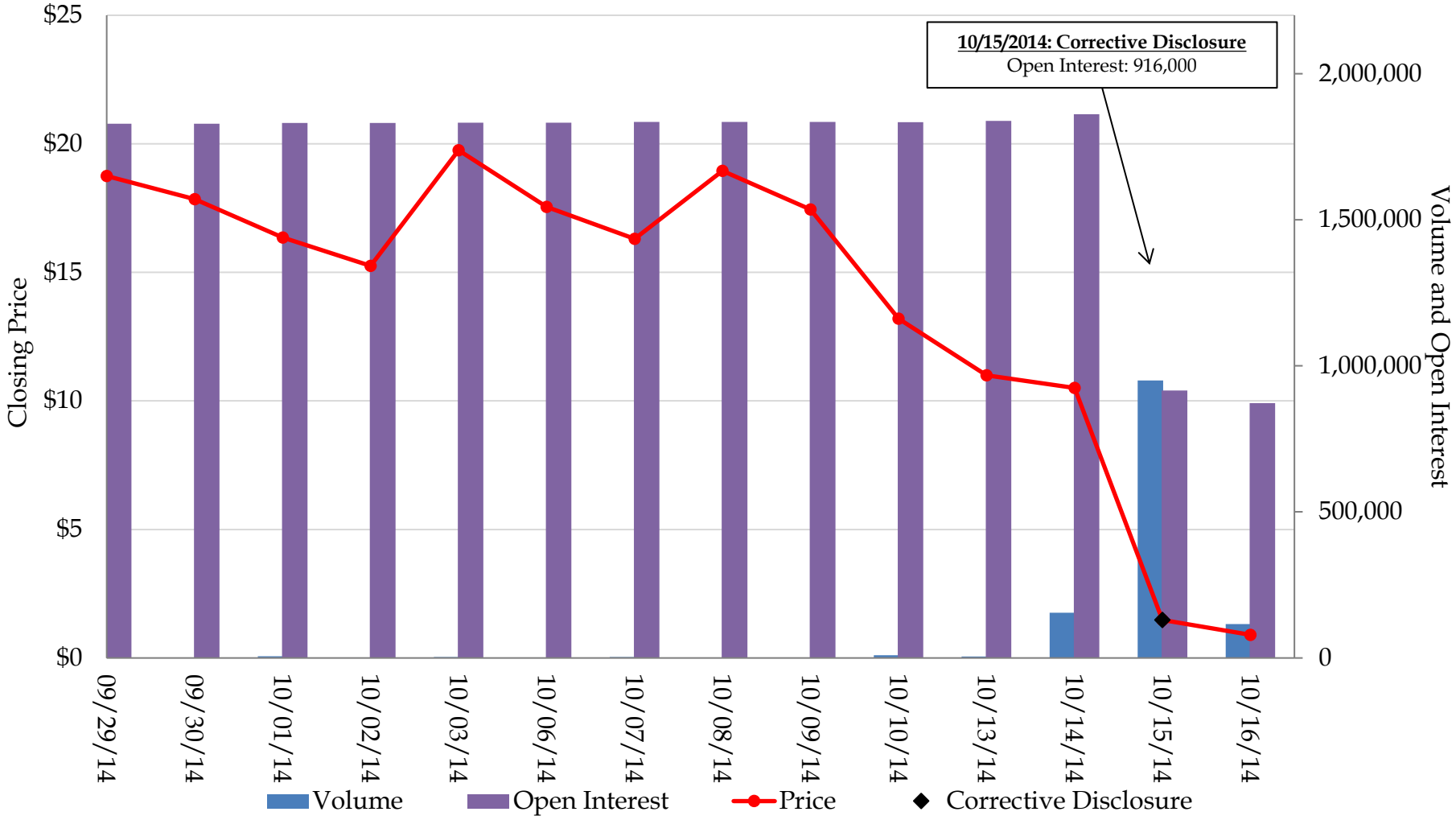
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1V
Put Option, $225 Strike Price, 10/18/2014 Expiration
9/29/2014 - 10/16/2014



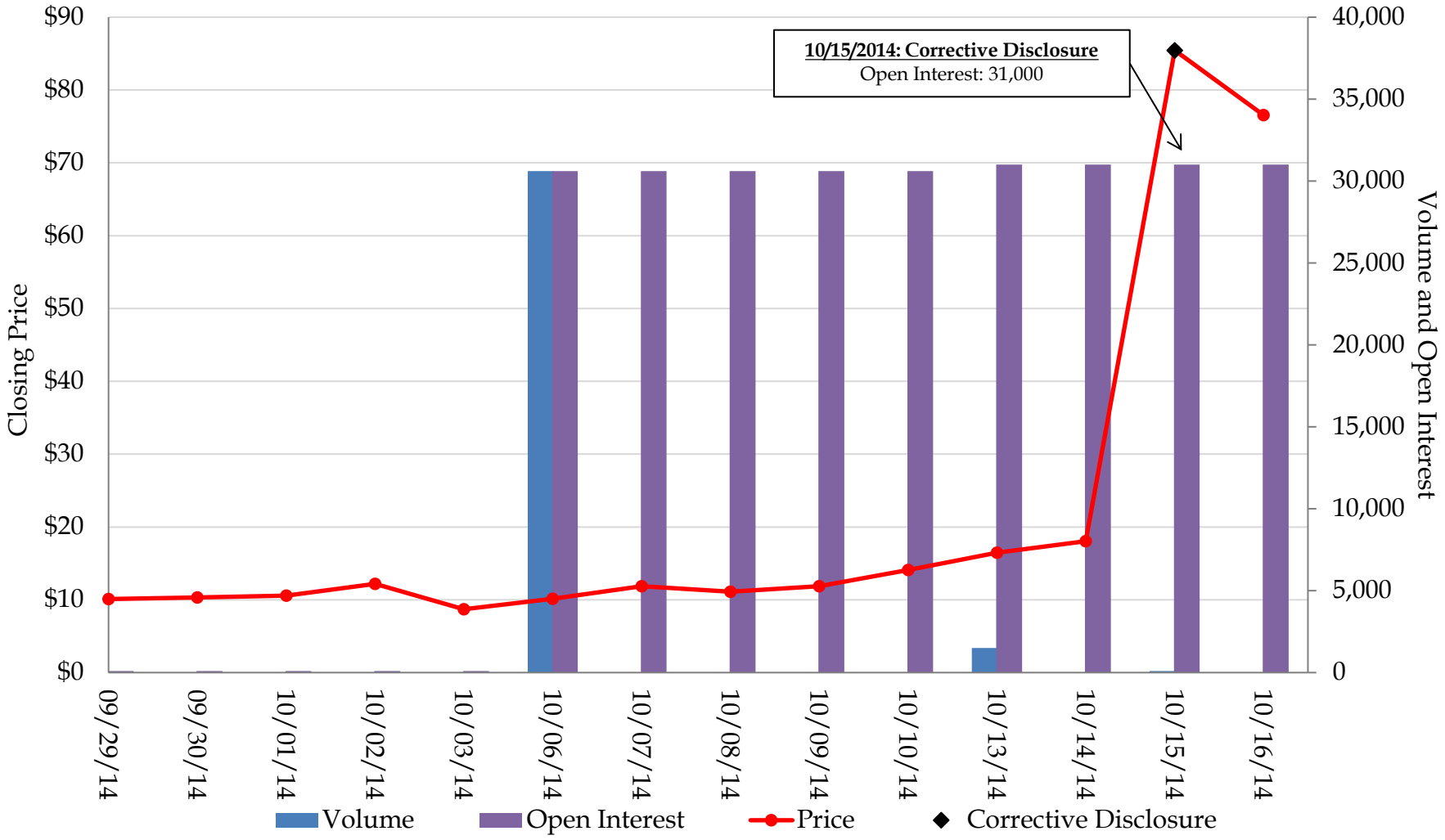
Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1W
Call Option, $255 Strike Price, 1/17/2015 Expiration
9/29/2014 - 10/16/2014



Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 1X
Put Option, $255 Strike Price, 11/22/2014 Expiration
9/29/2014 - 10/16/2014



Note: The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.
Sources: iVolatility and CBOE.

Exhibit 2

Summary of Event Study Results for Each Series in the Sample Options on the Corrective Disclosure Date

October 15, 2014

				Black-Scholes Option Pricing Model							
#	Option	Expiration	Strike Price	Based on Observed ADS Close Price October 14, 2014	Based on Expected ADS Close Price October 15, 2014	Expected Option Return	Observed Option Return	Abnormal Option Return	t-Statistic	P-value	Significance Level
[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]
1	Call	1/17/2015	$280	$2.30	$2.37	2.9%	-63.3%	-66.2%	-2.75	0.02	**
2	Put	1/17/2015	$220	$8.53	$9.13	7.0%	536.3%	529.2%	39.54	0.00	***
3	Call	11/22/2014	$250	$9.92	$9.20	-7.2%	-76.1%	-68.9%	-6.62	0.00	***
4	Put	1/17/2015	$200	$5.29	$6.53	23.4%	522.8%	499.4%	15.40	0.00	***
5	Call	11/22/2014	$275	$0.70	$1.32	87.3%	-13.0%	-100.3%	-4.71	0.00	***
6	Put	10/18/2014	$140	$0.00	$0.00			*insufficient data*			
7	Put	10/18/2014	$230	$2.56	$2.68	4.9%	4983.3%	4978.4%	107.85	0.00	***
8	Call	11/22/2014	$265	$3.96	$2.65	-33.1%	-72.7%	-39.6%	-1.59	0.14	
9	Put	10/18/2014	$252.50	$9.21	$10.83	17.6%	800.0%	782.4%	14.44	0.00	***
10	Put	11/22/2014	$230	$8.58	$10.04	16.9%	563.1%	546.2%	19.96	0.00	***
11	Call	11/22/2014	$270	$1.13	$1.89	66.6%	-48.0%	-114.6%	-4.77	0.00	***
12	Call	10/18/2014	$250	$2.01	$1.23	-38.9%	-69.2%	-30.3%	-2.34	0.04	**
13	Put	10/18/2014	$235	$3.14	$3.11	-1.0%	3129.6%	3130.6%	103.81	0.00	***
14	Call	10/18/2014	$255	$0.83	$0.51	-38.7%	37.5%	76.2%	3.52	0.00	***
15	Call	1/17/2015	$270	$4.84	$4.35	-10.1%	-55.6%	-45.5%	-4.61	0.00	***
16	Call	11/22/2014	$260	$5.08	$5.23	2.9%	-58.5%	-61.4%	-4.86	0.00	***

Exhibit 2

Summary of Event Study Results for Each Series in the Sample Options on the Corrective Disclosure Date
October 15, 2014

				Black-Scholes Option Pricing Model							
#	Option	Expiration	Strike Price	Based on Observed ADS Close Price October 14, 2014	Based on Expected ADS Close Price October 15, 2014	Expected Option Return	Observed Option Return	Abnormal Option Return	t-Statistic	P-value	Significance Level
[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]
17	Call	10/31/2014	$230	$19.54	$17.92	-8.3%	-87.1%	-78.8%	-23.37	0.00	***
18	Call	10/18/2014	$240	$8.79	$6.98	-20.6%	-88.8%	-68.2%	-7.40	0.00	***
19	Call	10/18/2014	$245	$5.27	$3.79	-28.1%	-81.6%	-53.5%	-4.04	0.00	***
20	Put	11/22/2014	$210	$5.55	$5.55	0.0%	761.2%	761.1%	23.97	0.00	***
21	Call	10/18/2014	$252.50	$1.28	$0.83	-35.6%	-72.0%	-36.5%	-2.61	0.04	**
22	Put	10/18/2014	$225	$2.18	$2.40	9.8%	4541.7%	4531.9%	37.89	0.00	***
23	Call	1/17/2015	$255	$10.34	$9.59	-7.2%	-86.0%	-78.7%	-7.86	0.00	***
24	Put	11/22/2014	$255	$17.32	$19.35	11.7%	373.4%	361.7%	21.57	0.00	***

Sources: iVolatility and CBOE.

Notes:

[B] - [D] According to iVolatility.

[E] Based on the Black-Scholes Option Pricing Model. Assumes the ADS close price on October 14, 2014 ($244.57) according to iVolatility, a risk-free rate of U.S. Treasury securities at 3-month constant maturity according to the Federal Reserve, implied volatility according to iVolatility, and no dividend payments.

[F] Based on the Black-Scholes Option Pricing Model. Assumes the expected ADS close price on October 15, 2014 ($242.49), a risk-free rate of U.S. Treasury securities at 3-month constant maturity according to the Federal Reserve, implied volatility according to iVolatility, and no dividend payments. Expected ADS close price on October 15, 2014 is calculated based on the observed ADS close price on October 14, 2014 multiplied by the expected ADS return on October 15, 2014 ($242.49 = $244.57 * (1 + [-0.85%]). Expected ADS return on October 15, 2014 is from the event study described in my Efficiency Report ¶¶48-51.

[G] = [F] ÷ [E] - 1

[H] The option price reflected on each day is the mean of the closing bid and ask price from iVolatility. If that price was not available, I use the last intraday trade price according to CBOE. If neither of those prices are available, I used the midpoint of the last intraday quote according to CBOE.

[I] = [H] - [G]

[J] Calculated as [I] divided by the standard deviation of the abnormal returns during the Class Period, excluding the alleged corrective disclosure date.

[K] Based on [J] and degrees of freedom equal to the number of observations - 1.

[L] *** Denotes statistical significance at the 99% confidence level or greater. ** Denotes statistical significance at the 95% confidence level or greater.

Exhibit 3
Trading Statistics for Each Series in the Sample Options During the Class Period
September 29, 2014 through October 14, 2014

#	Option	Expiration	Strike Price	Total Volume Traded (in shares, 1/100th of a contract)	Percent of Days Traded
1	Call	1/17/2015	$280	1,151,300	92%
2	Put	1/17/2015	$220	852,800	75%
3	Call	11/22/2014	$250	518,600	67%
4	Put	1/17/2015	$200	277,800	33%
5	Call	11/22/2014	$275	119,800	17%
6	Put	10/18/2014	$140	104,500	25%
7	Put	10/18/2014	$230	211,500	75%
8	Call	11/22/2014	$265	96,500	42%
9	Put	10/18/2014	$252.50	108,600	25%
10	Put	11/22/2014	$230	79,700	17%
11	Call	11/22/2014	$270	86,800	17%
12	Call	10/18/2014	$250	132,000	92%
13	Put	10/18/2014	$235	68,000	58%
14	Call	10/18/2014	$255	56,400	50%
15	Call	1/17/2015	$270	88,000	92%
16	Call	11/22/2014	$260	49,200	50%
17	Call	10/31/2014	$230	45,000	8%
18	Call	10/18/2014	$240	46,200	25%
19	Call	10/18/2014	$245	45,700	42%
20	Put	11/22/2014	$210	40,700	25%
21	Call	10/18/2014	$252.50	40,000	8%
22	Put	10/18/2014	$225	128,900	67%
23	Call	1/17/2015	$255	181,800	75%
24	Put	11/22/2014	$255	32,100	17%

Total Volume for All Options:	**4,561,900**

Source: iVolatility.

Notes:

Total Volume Traded is calculated as the sum of daily volume from September 29, 2014 through October 14, 2014.

Percent of Days Traded is calculated as the number of trading days the option had volume greater than zero divided by 12, the number of trading days in the Class Period.

Appendix A
Documents Considered

Court Documents

- Coffman Market Efficiency Report, *In Re Murray Rubinstein, el al v. Richard Gonzalez and AbbVie,* dated December 21, 2017.
- Deposition of Chad Coffman, CFA, dated February 22, 2018.
- Coffman Supplemental Efficiency Report, *In Re Murray Rubinstein, el al v. Richard Gonzalez and AbbVie,* dated March 9, 2018.
- Report of Allan W. Kleidon, *In Re Murray Rubinstein, el al v. Richard Gonzalez and AbbVie*, dated April 19, 2018, including all backup materials received.
- Deposition of Allan W. Kleidon, dated May 25, 2018.

Court Decisions and Securities Law

- *Cammer v. Bloom*, 711 F. Supp. (D.N.J. 1989).

Security Data

- Shire PLC ADS options data were obtained from IVolatility, *see* http://www.ivolatility.com.
- Intraday Shire PLC ADS options data were obtained from Cboe DataShop, *see* https://datashop.cboe.com.

Academic Articles/Texts

- Aharony, Joseph and Itzhak Swary, "Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis," *The Journal of Finance* 35(1) (1980).
- Binder, John, "The Event Study Methodology Since 1969," *Review of Quantitative Finance and Accounting* 11 (1998).
- Chan, Kalok and Y. Peter Chung, "Asymmetric Price Distribution and Bid-Ask Quotes in the Stock Options Market," *Asia-Pacific Journal of Financial Studies* 41(1) (2012), pp. 87-102, found at https://doi.org/10.1111/j.2041-6156.2011.01063.x
- Goh, Leng Y. and David Allen, "A Note on Put-call Parity and the Market Efficiency of the London Traded Options Market," *Managerial and Decision Economics* 5 (1984).
- Kamara, Avraham and Thomas W. Miller, Jr., "Daily and Intradaily Tests of European Put-Call Parity," *Journal of Finance and Quantitative Analysis* 30 (1995).

- MacKinlay, A. Craig, "Event Studies in Economics and Finance," *Journal of Economics Literature* 35(1) (1997).
- Tabak, David I. and Frederick C. Dunbar, "Materiality and Magnitude: Event Studies in the Courtroom," Ch. 19, *Litigation Services Handbook, The Role of the Financial Expert*, Third Edition, 2001.

All data and documents referenced in this Rebuttal Report or my Prior Reports that are not specifically mentioned in this Appendix were also considered.